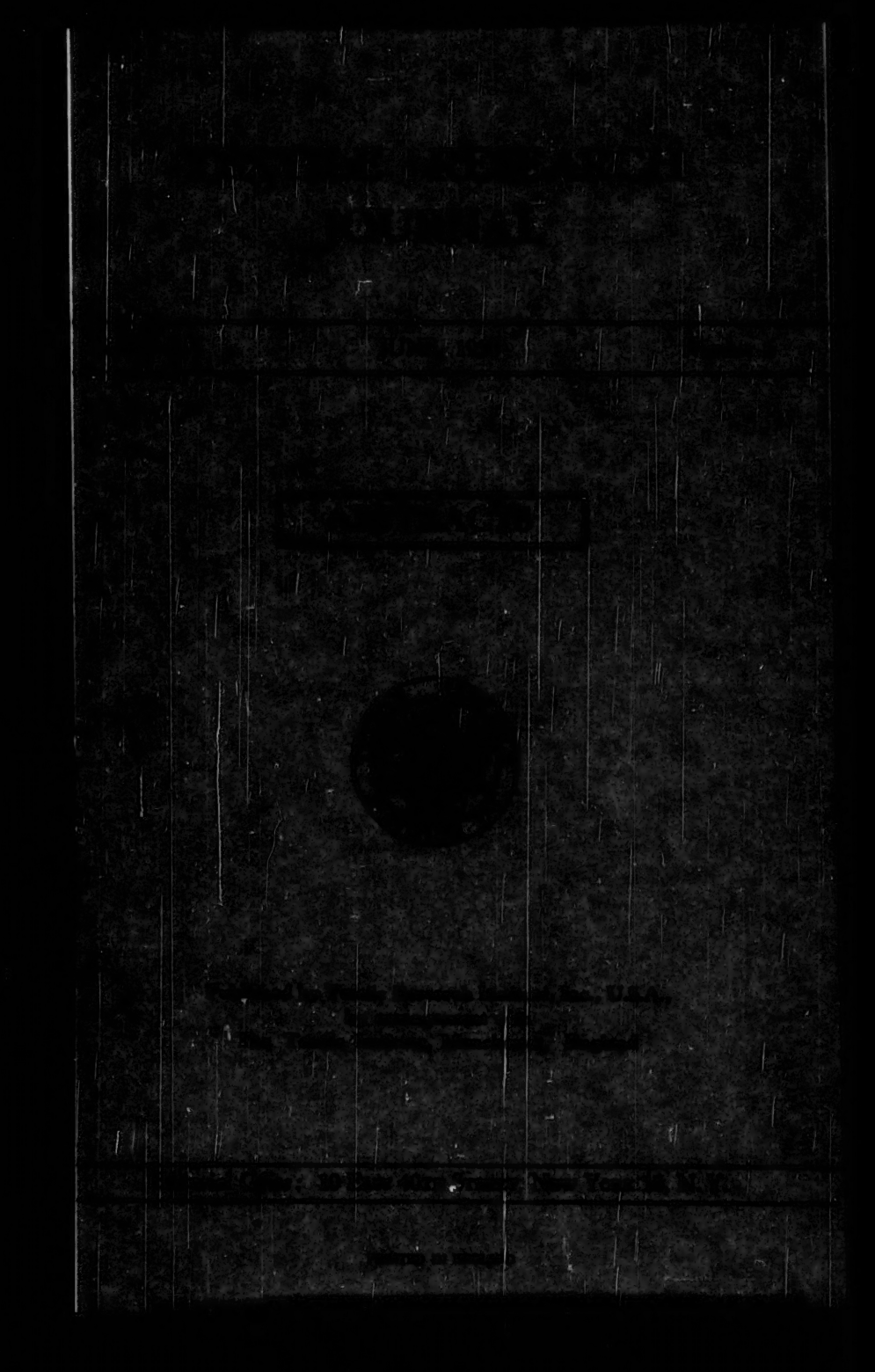

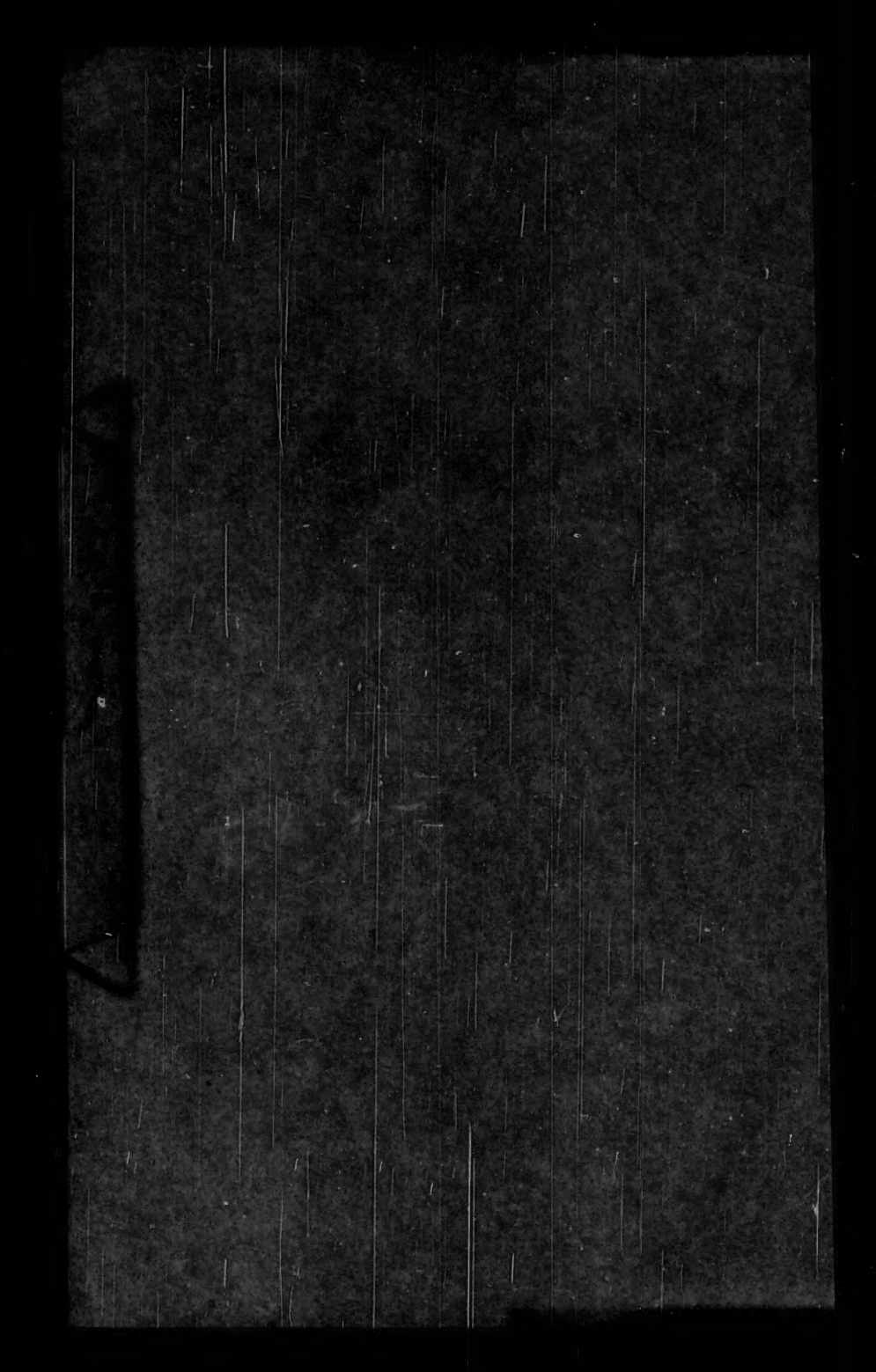

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ABSTRACTS

(The titles which are set in bold-face are intended as "scanning titles" for ease in classifying and filing. Where these are not substantially the authors' titles the exact titles are set in parentheses.)

1—FIBRES AND THEIR PRODUCTION

(B)—ANIMAL

Hair as a Textile Fibre. J. C. de Klerk. *Farming in South Africa*, 1950, **25**, No. 287, 43-46. W—**1B.**

Sheep Tick: Laboratory Tests with Various New Insecticides. C. M. Gjullin. *J. Econ. Entomol.*, 1949, **42**, 984-985. Sheep ticks were exposed on wool cloth treated with acetone containing high dosages of various insecticides. Of the 20 insecticides tested, only 5 caused 90 per cent. or higher tick mortality in 24 hr. The tests indicate that several of the newer insecticides may be more effective than those now in use against the sheep tick. W—**1B.**

Sheep Tick Pupæ: Effect of Insecticides. R. A. Hoffman. *J. Econ. Entomol.*, 1949, **42**, 984. Laboratory tests have shown that various common insecticides cause little, if any, mortality of sheep tick pupæ, and that the addition of a wetting agent does not enhance the effectiveness of the materials. W—**1B.**

Sheep Tick and Migration of Sheep Tick on the Animal: Effect of Air Temperature on the Insecticidal Action of some Compounds. R. A. Hoffman, A. R. Roth and A. W. Lindquist. *J. Econ. Entomol.*, 1949, **42**, 893-896. In laboratory tests many more sheep ticks were killed at 70° F. than at 90° F., when exposed to wool treated with DDT, methoxychlor, and dichlorodiphenyl dichloroethane. The reverse was true with toxaphene, benzene hexachloride, and chlordan. The sheep tick remains on the skin of sheep at air temperatures of about 35° and below, but may be found a short distance from the skin at higher temperatures. At 80° and 90° many of the ticks are on the outer wool surface. In controlling the sheep tick by means of sprays, advantage can be taken of outward migration of ticks by spraying during the warmer seasons of the year. W—**1B.**

(C)—VEGETABLE

Flax Variety Trials. *N.I. Min. Agric. Monthly Report*, 1950, **24**, No. 11, 336-339. Results of trials over a lengthy period, 1933-1948, are summarised. Tables are given of the yield of scutched flax per acre, value of scutched flax per stone, and value of scutched flax per acre. The superiority of pure strains over commercial flax is shown. Stormont Gossamer and Liral Prince were consistently the best, with Stormont Cirrus, Liral Crown and Stormont Motley (tested for four years only) in good positions. Concurrent was considerably inferior to the pure strains on account of low yield and the lower value of the fibre. L—**1C.**

Cotton Plant: Fertilising with Phosphates. W. L. Nelson, B. A. Krantz, C. D. Welch and (1) N. S. Hall, (2) L. A. Dean. *Soil Science*, 1949, **68**, (1) 137-144, (2) 151-156 (through *Chem. Abstr.*, 1950, **44**, 256^{f}, 257^{a}). Field trials are reported on the utilisation of P by the cotton plant in N. Carolina. The effects of the type of phosphatic fertiliser, the age of the plant, the P content of the soil and the mode of application (*e.g.* broadcast) are discussed. C—**1C.**

Cotton Insect Pests: Control by Calcium Arsenate Preparations. J. S. Roussel and J. C. Gaines. *J. Econ. Entomol.*, 1949, **42**, 551-552 (through *Chem. Abstr.*, 1950, **44**, 267^{b}). In cage tests, commercial calcium arsenate and a specially prepared calcium arsenate (33·2 per cent. total As; 6·7 per cent. water-soluble As; *pH* 6·9; no free lime) were equally toxic to the boll weevil. Against cotton

aphid, a mixture of the special calcium arsenate with 0·1 per cent. of "parathion" was more toxic than the special calcium arsenate with 0·5 per cent. of γ-benzene hexachloride. C—**1C.**

Cotton Insect Pests: Control in Mexico. Ignacio Moreno. *J. Econ. Entomol.*, 1949, **42**, 484-486 (through *Chem. Abstr.*, 1950, **44**, 789[i]). Trials with various new organic insecticides for the control of insects that attack cotton in the La Laguna District, Mexico, led to the following conclusions: (1) cotton insects can be controlled and cotton yields improved by the use of insecticides; (2) applications at about 7-day intervals are necessary; (3) 6 per cent. γ-benzene hexachloride does not prevent the establishment of pink bollworm (*Pectinophora gossypiella*) infestations, although 2 per cent. will control cotton aphid and light infestations of boll weevil; (4) DDT is necessary for the control of pink bollworm; (5) planting of cotton late in the season is not profitable in this district. C—**1C.**

Ceylon Cottons: Botanical Names. ("The Correct Botanical Names of Certain Economic Plants Cultivated in Ceylon.") J. E. Senaratna. *Tropical Agriculturist*, 1948, **104**, 205-209. A paper listing the correct botanical names of economic plants cultivated in Ceylon includes the correct terminology for cotton varieties belonging to *Gossypium arboreum* L., *G. barbadense* L., *G. barbadense* L. var. *brasiliense*, and *G. hirsutum*, together with references and the incorrect names commonly used. C—**1C.**

Cotton: Production in Malta. *Report on the Working of the Dept. Agric. Malta*, 1938-1947. (Published 1949) pp. xxxiv-xxxvi. In a report on the main crops of Malta, figures are given for the acreage under cotton, yield of ginned cotton and value of ginned cotton during the period 1938/39 to 1946/47. Cotton production, which was only on 48 acres at the beginning of the period, discontinued completely in 1944/45. C—**1C.**

American Cotton Verticillium Wilt: Occurrence in 1948. J. T. Presley. *Phytopathology*, 1949, **39**, 499 (through *Rev. Appl. Mycol.*, 1950, **29**, 26). *Verticillium* wilt of cotton (*V. albo-atrum*) is now known to occur throughout the Cotton Belt of the United States from the Atlantic to the Pacific. Losses from the disease, though varying from year to year in any particular locality, appear to be constantly on the increase, resulting in the intensification of efforts to develop a *Verticillium*-resistant variety. C—**1C.**

Blackarm-resistant Cotton: Breeding. L. M. Blank. *Phytopathology*, 1949, **39**, 494-495 (through *Rev. Appl. Mycol.*, 1949, **28**, 573). The Stoneville 20 strain of cotton has been used as the blackarm-resistant parent in a number of crosses with susceptible varieties and breeding strains of cotton. The resultant progenies were carried through the F_3 generation or back-crossed twice to the recurrent susceptible variety or strain, selfed and tested for reaction to the disease. Inoculation of the breeding material in field plantings was effected by spraying the lower leaf surfaces of 5 to 8-week old plants with a suspension of the organism, and grading for disease reaction was made 15 to 20 days later. The lesions of resistant phenotypes are fewer and smaller than those of susceptible ones. F_1 offspring of the susceptible cross were susceptible, but the F_2 progenies segregated at a ratio approximately 3:1 for susceptibility and resistance. The approximation was closest in crosses involving highly susceptible varieties like Acala and less so in those with considerable natural tolerance. Progenies derived from selfing after one and two back-crosses yielded populations pure for susceptibility or segregating, the latter consisting of susceptible and resistant plants in a 3:1 ratio. These data indicate that the Stoneville 20 type of resistance to blackarm is inherited as a single factor, with resistance recessive to susceptibility. C—**1C.**

Blackarm-resistant Cotton: Breeding in Madras. R. Balasubrahmanyan and A. Raghavan. *Cotton Pests and Diseases Papers, Indian Central Cotton Committee*, 1949, **4**, 5 pp. (through *Rev. Appl. Mycol.*, 1949, **28**, 572). In 1945, the cotton crop in most of the areas in Madras receiving intermittent heavy rains developed heavy blackarm infection and total production fell considerably. Results are reported of the first two years work in a programme of breeding blackarm-resistant strains (using the secondary infection method). Experimental evidence supported the view that differential biological races of the organism do exist and that the Indian races can break the resistance of B_2B_3 types singly or

severally unless strengthened by the addition of major or minor genes from the acclimatised Madras Uplands. C—**1C.**

Cotton Plants: Inoculation by Hypodermic Injection. L. A. Brinkerhoff. *Phytopathology*, 1949, **39**, 495 (through *Rev. Appl. Mycol.*, 1949, **28**, 573). Inoculating cotton plants in California and Arizona with *Verticillium* wilt by hypodermic injection and wound inoculation both produced high percentages of infection in young field-grown plants in 1947 and 1948, but the former was much the more rapid, being about equal to soil infestation in this respect. A veterinary syringe with a No. 24 needle was used to inject about 0·25 cc. inoculum just below soil level into the hypocotyl of seedlings with two to four true leaves. Within three weeks symptoms developed on 99 per cent. of the plants of the susceptible variety Acala 1-23-11, and 98 per cent. on those of the tolerant Missdel × Acala 10-13, the latter suffering much less severely than the former and compromising a far higher percentage of recoveries. C—**1C.**

Cotton "Ramulosis" Disease: Symptoms. ("Instruçoes para o reconhecimento da 'ramulose' do Algodeiro.") P. Abrahão and A. S. Costa. *Biológico*, 1949, **15**, No. 3, 59-60 (through *Rev. Appl. Mycol.*, 1949, **28**, 574). A description is given of the symptoms of cotton "ramulosis" (an extreme form of anthracnose caused by *Colletotrichum gossypii* var. *Cephalosporioides*), which has now been reported from Pernambuco, Parahyba, Rio Grande do Norte, Pará, and São Paulo, Brazil, causing reductions in yield ranging from 30 to 70 per cent. A number of commercial varieties with adequate resistance to ramulosis are at present available. C—**1C.**

Cotton Insecticides: Toxicity; Effect of Temperature and Humidity. J. C. Gaines and H. A. Dean. *J. Econ. Entomol.*, 1949, **42**, 429-433 (through *Brit. Abstr.*, 1950, B III, 7). The effectiveness of all materials used in cage tests against cotton boll weevils was reduced by high temperature and/or high relative humidity in the following order of decreasing toxicity: calcium arsenate, Toxaphene (20 per cent.)-S, γ-benzene hexachloride (3 per cent.)-DDT (5 per cent.)-S, Chlordane (10 and 20 per cent.). At 25 to 40° C., dosages of the $C_6H_6Cl_6$-DDT dust up to 30 lb. per acre were required for a high mortality of weevils, and 23 lb. per acre of Chlordane (10 per cent.) were necessary for 50 per cent. kill. Releasing the weevils 24 hours after dusting the plants and/or exposure of dusted plants to the sun for four hours, reduced the toxicities of Toxaphene and Chlordane dusts. C—**1C.**

Raw Cotton: Purchase and Distribution. A. Bryce Muir. *J. Textile Institute*, 1950, **41**, P37-P40. A lecture. Some aspects of the purchase and distribution of raw cotton in the United Kingdom are discussed. The pre-war trade, which was centred around the Liverpool Cotton Market, is reviewed. The cotton situation during the war is outlined and the post-war development with the formation of the Cotton Commission are discussed briefly. C—**1C.**

(D)—Artificial

Beech and Pine Pulps: Swelling and Dissolving Mechanism in Viscose Production. H. Haas. *Papier*, 1948, **2**, 397-401 (through *Brit. Abstr.*, 1949, BII, 1157). The greater tendency of beech pulp to form badly-filtering viscose solutions compared with pure pulp was the reason for a comparative investigation of the swelling and dissolving mechanism in the xanthation of both kinds of fibre. Apart from the great difference between the fibres, swelling phenomena are qualitatively completely similar in both cases. Of particular influence on the course of the reaction is the proportion of outer layer. This dissolves no more slowly than the middle layer, but swells to a much lower degree, so that at the beginning of the reaction, under certain conditions, a disproportionate quantity of carbon disulphide is yielded, which can lead to the formation of insoluble residues. With beech pulp this initial irregularity of reaction is more marked than with pine, on account of which residues that cannot be filtered are formed more readily. C—**1D.**

Alkali-soluble Metal Carboxymethylcellulose Fibres: Preparation and Properties. J. D. Reid and G. C. Daul. *Textile Research J.*, 1949, **19**, 794-801. Metal carboxymethylcellulose fibres have been produced from sodium carboxymethylcellulose and suitable metals, both on a laboratory scale and on a pilot-size spinning machine. These fibres are capable of cross-linkage to produce fibres of strengths from 1 to 2 g. per grex. A mixed cu Al carboxymethylcellulose fibre

is the most satisfactory from the standpoint of strength, appearance, flexibility, feel and similar characteristics. The fibres are soluble in alkali and similar to the alginic acid fibres and should be suitable for similar uses. Some cross-sections of these carboxymethylcellulose yarns are shown. C—**1D.**

Cuprammonium Rayon: Stretch-spinning; Mechanism. Viktor Elsaesser. *Kolloid-Z.*, 1949, **112**, 120-141 (through *Brit. Abstr.*, 1949, BII, 1158). The relations between viscosity, tension, temperature, and tensile strength were investigated. The viscosity increases with the distance from the nozzle, but becomes constant at the coagulation point. At any intermediate distance the tension increases with temperature, but the final value is independent of temperature. The effect of temperature on the relation between filament velocity, v_F at any point and the distance x from the nozzle is shown graphically; v_F increases with x up to a final constant value. Homogeneous threads of reproducible strength for different thread sizes can be made by extending on to a rotating table, but the strength is lower owing to reduced stretching. The optimum viscosity at the coagulation point is 56,500 poises, independent of temperature, and an expression for the tension at optimum viscosity is also given. A formula is derived for the tensile strength assuming the thread to be made up of a disordered core and an ordered outer layer. C—**1D.**

Cellulosic and Protein Rayons: Progress in Manufacture, 1949. J. A. Somers. *British Rayon & Silk J.*, 1950, **26**, February, 51-52. Recent progress in the manufacture of cellulosic and protein rayons is briefly surveyed. The attainment of uniformity of quality in rayons is considered. The use of stretching and formaldehyde treatments for the improvement of the low wet strength of cellulose rayons is discussed, and reference is made to research which has been carried out on the air oxidation of alkali-cellulose. Progress in the manufacture of cellulose acetate is dealt with, the stretching and dyeing of acetate rayon being mentioned in particular. Two new protein fibres which have been introduced during 1949 are mentioned, *viz.* Vicara and a cottonseed protein fibre (unnamed). Unshrinkable finishes for rayon fabrics are considered briefly. There are 33 references, mainly to patents. C—**1D.**

Regenerated Protein Fibres: Production and Structure. ("Synthetic Fibres Made from Proteins.") H. P. Lundgren. *Advances in Protein Chemistry*, 1949, **5**, 305-351. A review is given of work on regenerated protein fibres, with emphasis on practical aspects. The solubilisation, unfolding, and formation of fibres are discussed and the application of detergents in the preparation of protein fibres is considered. The molecular basis for the mechanical properties is considered, including the degree of orientation and crystallisation of the chains, and the nature of the forces responsible for chain interaction. Methods by which network-stabilising bonds in protein fibres can be studied are reviewed. It is shown how through thermo-elastic measurements on fibres made from feather keratin several types of bonds which stabilise the fibre network may be identified. Illustrations are given. There are 174 references to the literature. C—**1D.**

"Pulling" Rayon Threads: Production. ("Étude systématique de la production du fil tirant.") Canon J. Pinte and Jean Henno. *Bull. Inst. Textile, France*, 1949, No. 15, 9-41. *Rayonne*, 1950, **6**, No. 3, 60-66; No. 4, 37-45. It has previously been established[1] that the elongation on contraction of rayon filaments on wetting, followed by drying, is related to their state of stretching and permits the prediction of their tendency to pull. Using the apparatus described[1] some series of tests have been carried out on 40-fil 100-den. viscose rayon yarn deformed by either the application of a given load or by instantaneous stretching. The results are presented in tables and graphs and are discussed under the headings: (*a*) Wetting produces elongation; (*b*) Wetting produces neither elongation nor contraction; and (*c*) Wetting produces contraction. On interpreting the results from a practical point of view it is found that for yarns stretched by the application of a given load the importance of the pulling thread increases rapidly with the moisture content of the equilibrium atmosphere above 65 per cent. R.H.; for yarns deformed by the same degree of stretching the importance of the pulling thread decreases with the moisture content of the atmosphere. The conclusion is drawn that the most serious and most frequent accidents may be avoided by working in an atmosphere of 65 per cent. (or less) R.H. A theoretical interpretation of the observed phenomena is put forward. ([1]*J. Textile Institute*, 1950, **41**, A304.) C—**1D.**

Superpolyurethanes: Preparation, Properties and Utilisation. ("Les superpolyuréthanes.") Maurice Souvé. *Chimie et Industrie*, 1949, **62**, 451-460, 570-574; 1950, **63**, 43-47. After a brief review of the researches leading to the development of the polyurethanes and a discussion of the intermediate products (polyisocyanates and hydroxylated poly-esters), five main processes for their preparation are briefly considered. The main commercial types of polyurethanes and superpolyurethanes and their productions are reviewed under the headings: (i) Mouldable polymers (including the Igamids), (ii) spinnable polymers (Perlons), (iii) elastomers (I-Gummis), (iv) lacquers and varnishes, (v) adhesives (Polystals), and (vi) foams and porous plastics (Moltoprens). The general characteristics and properties of these products are described and illustrated under the same headings. Finally, application techniques and industrial utilisation of these products are discussed and reference is made to the main patents covering these processes. **C—1D.**

PATENTS

Polyamides, Natural and Synthetic: Swelling and Dissolving. William Harrison. B.P.626,380 of 13/2/1947: 14/7/1949. The claims are for the use as swelling agents or solvents for natural or synthetic polyamides (silk, casein, soybean or peanut protein, animal protein or nylon) of solutions of strong acids (*e.g.* HCl) to which agents are added to reduce ionisation, such as salts of the alkalis or alkaline earths (*e.g.* calcium chloride) or mono- and poly-hydric alcohols, or formic, acetic and lactic acids. C.

Thread-advancing Reel. E. I. Jones and Imperial Chemical Industries Ltd. B.P.626,508 of 24/1/1947: 15/7/1949. A thread-advancing reel (*e.g.* for the continuous processing of yarn with liquid agents) comprises two supporting discs or wheels that can rotate about parallel axes, each support carrying at its periphery a set of identical parallel arms so arranged that the arms of one set intermesh with those of the other set. Each arm has a saw edge projecting outwards from the reel, the teeth being substantially triangular but of unequal sloping sides. The apices of corresponding teeth on all the arms of one set lie in one plane, but the two sets present different planes, and the teeth on one set are laterally offset half a pitch from those of the other set. C.

Lubricated Regenerated Collagen Threads: Production. American Cyanamid Co. B.P.626,542 of 9/4/1947: 18/7/1949 (Conv. 19/4/1946). A lubricated collagen filament or thread (especially for surgical sutures) is obtained by extruding a collagen solution into a coagulating salt bath that contains an emulsified phosphatide, *e.g.* lecithin. C.

Sodium Alginate Spinning Solution of Reduced Viscosity. Courtaulds Ltd., E. T. Tallis and H. R. S. Clotworthy. B.P.627,151 of 24/6/1947: 29/7/1949. The viscosity of a sodium alginate solution for extrusion to filaments is reduced by the addition of sodium hyposulphite ("hydrosulphite"). A suitable solution contains 5-15 per cent. of the alginate and has *pH* 6·0 to 9·5 and a viscosity of 35-70 (measured as the time in seconds for a $\frac{1}{8}$-in. steel ball to fall through 20 cm. of solution in a 2 cm. tube). For such a fall in viscosity (from say 150 seconds) an addition of less than 1 per cent. of $Na_2S_2O_4$ is usually sufficient. C.

Polydiene Filaments and Films: Production. N.V. De Bataafsche Petroleum Maatschappij. B.P.627,209 of 30/11/1945: 3/8/1949 (Conv. 9/4/1943) and 627,210 of 30/11/1945: 3/8/1949 (Conv. 23/3/1944). These inventions relate to the polymerisation of natural or synthetic dienes (*e.g.* rubber or butadiene) with tetrahydronaphthalene peroxide, extrusion of a solution of the unsaturated polymer (*e.g.* in benzene + isopropyl ether) into a coagulating bath (*e.g.* aqueous alcohol), and treatment of the coagulated filaments or film with sulphur dioxide. (1) The sulphur dioxide is contained in the coagulating bath and the stretch-spinning method is employed. The products contain about 11 per cent. of sulphur. (2) The fresh filaments are stretched after coagulation. The proportions employed lead to products with 16 per cent. or more of sulphur. C.

Plasticized Ethylcellulose: Production for Moulding or Extrusion. Standard Telephones and Cables Ltd. (assignees of A. J. Warner and W. de Camp Crater). B.P.627,298 of 21/6/1946: 5/8/1949 (Conv. 30/6/1945). The claim is for mixtures of ethylcellulose (80 to 60) and certain liquid or solid di- or tri-meric styrenes, for use as moulding or extrusion masses. C.

Polyvinyl Chloride Solutions for Filament- or Film-formation or for Coating Wire, Yarns and Cords. Donald Finlayson and A. W. M. Cooke (British Celanese Ltd.). B.P.627,426 of 28/3/1947: 9/8/1949. Polyvinyl chloride (insoluble in methyl ethyl ketone) is dissolved in a mono-cyclic compound (*e.g.* cyclohexanone or cyclopentanone) and the solution is diluted with at least eight times its weight of a more volatile non-solvent for the plastic, *e.g.* methyl ethyl ketone or methylene chloride, alone or mixed with acetone. The solutions may be used for forming filaments and films or for coating wires or strengthening regenerated cellulose yarns or cords. C.

Glass Filaments: Production. W. R. Schlehr (of Glass Fibers Inc.). B.P. 627,585 of 20/9/1946: 11/8/1949; 627,863 of 1/10/1946: 17/8/1949. (1) It is reported that stronger glass filaments are secured by extrusion and drawing at temperatures rather below the melting point of the glass. The invention relates to means for creating pressure on the contents of the crucible so as to assist the passage of the glass through the apertures of the extrusion apparatus. The aim is to produce filaments of 0·00025 inch diameter by extruding glass at 2250 ± 10° F. through orifices of 0·40 ± ·006 in. diameter, and the pressure is derived by adding to the mass substances that liberate gas. A suitable mixture is dolomite (22·4 parts), limestone (17·4), borax (5¼), boric acid (5¼), kyanite (23¾) and sand (48¼). The apparatus is fitted with a safety valve. (2) The molten glass is "conditioned" by maintaining it at a high temperature in a melting chamber before transferring it to the drawing chamber where it is maintained at a constant, lower temperature for extrusion under pressure. C.

Aminopolymethylenecarboxylic Acid Amide Filament-forming Condensates: Production. Algemeene Kunstzijde Unie N.V. B.P.627,596 of 24/10/1946: 11/8/1949 (Conv. 13/9/1946). A process for the production of macromolecular condensation products, capable of extrusion to very strong filaments, from monomeric aminopolymethylenecarboxylic acid amides is characterised in that the first stage (the "pre-condensation") is effected in the presence of water. An aliphatic mono- or di-carboxylic acid, or an aliphatic diamine may be used as a catalyst. Thus, ω-aminocapramide (5 kilo.) is mixed with water (5 l.) and acetic acid (3 gm.) and heated in an autoclave at 250° C. for 8 hours, the ammonia being regularly removed. The water vapour is then removed and the second stage of the condensation is completed by heating for a further 2½ hours. C.

Viscose Thread Storing and Advancing Apparatus. Algemeene Kunstzijde Unie N.V. B.P.627,843 of 27/6/1946: 17/4/1949 (Conv. 30/6/1945). A thread-storage, thread-advancing device for processing freshly extruded viscose thread comprises (*a*) an outer cage consisting of a series of bars; (*b*) a frame inside (*a*) supporting one or more spur gears arranged with their axes parallel to the axis of (*a*) so that on rotation one or more of the teeth of each spur gear extend somewhat beyond the bars of cage (*a*), the crowns of the teeth having a screw thread that contributes to a continuous screw thread on each spur gear, and (*c*) a pair of concentric shafts, one for (*a*) and the other for (*b*), that can be driven independently. Details are shown in six sheets of machine drawings. C.

2—CONVERSION OF FIBRES INTO FINISHED YARNS

(A)—Preparatory Processes

Wool: Dry-Cleaning Process. M. T. Hoffman. *Canadian Text. J.*, 1950, **67**, No. 7, 51-53. It is claimed that the continuous Hoffman-Fiala process (these Abstracts, 1950, A179) offers numerous advantages over the continuous trichloroethylene system and over conventional scouring methods using soap and alkali in the dry-cleaning of greasy wool. W—**2A.**

Peralta Machine—A Contribution to the Manufacture of Quality Wool Yarns. W. J. Crofts. *Text. Ind.*, 1950, **114**, No. 3, 103-105. Some improvements resulting from the use of Peralta crush rollers are described. The subjects discussed include roller pressures, location of Peraltas, and maintenance. The installation of a neutraliser of static electricity on a Peralta delivery is also described. W—**2A.**

Carding: Rigid Wire *versus* Flexible Wire. A. Varga. *Canadian Text. J.*, 1950, **67**, No. 5, pp. 57-59. The functions of the wires on a carding machine are described in relation to the merits of flexible card clothing, Continental card clothing and Garnett wire. W—**2A.**

Tape Condensers: Management Technique. *Platt's Bulletin*, Vol. VII, No. 1, 19-22. After mentioning some of the different effects of using the single ring doffer type and the modern tape condenser, the two types of tape condenser, *viz.* the deep groove pattern with one tape serving for each thread, and the shallow groove model with one tape serving for two threads, are described. The importance of tape tension and careful setting of the various tape carrying rollers is emphasised. The new model tape condenser has been built with a fixed relative position between the tape entry rollers and the dividing rollers in order to produce satisfactory results, particularly in the regularity of roving count. The setting of the rubbers and speeds of the rubbers in relation to the tapes are also discussed. An increase in production of up to 100 per cent. without sacrificing quality is said to occur as a result of replacing single ring doffers by tape condensers. W—**2A.**

Carding: Elimination of Defects; Stripping Motions. *Wool Record*, 1950, **77**, 1047, 1049, 1051. Several suggestions relating to efficient carding are made. The subjects discussed include setting of workers, methods of stripping, low and high stripping, and uneven web tension. W—**2A.**

Worsted Drawing: Economies in—. R. S. Audley. *Fibres*, 1950, **11**, 109-110. Methods which may lead to economies in the processing of tops prior to spinning are discussed. These include Ambler Super-drafting, and, on the "American" system of drawing, the Whitin and Saco-Lowell methods. The possibilities of utilising a Noble comb sliver with a view to eliminating some of the drawing operations are mentioned. W—**2A.**

Pin Drafting: Oil-applying Device. Bachmann Uxbridge Worsted Corporation. *Textile World*, 1950, **100**, No. 4, 148. The Uxbridge Control-Spray, a new oil-tint applicator for pin drafters and gill boxes, is described. This device is almost 100 per cent. automatic and is said to eliminate hit-or-miss application of oil. Other advantages claimed include the almost complete elimination of oil and tint accumulations at the front end of the pin, more uniform application of oil, and better penetration of the wool sliver. The oil is applied after the sliver passes through the fallers. W—**2A.**

Flax Retting: Relationship of Fibre Quality to Bacterial Flora. G. W. Lanigan (Flax Res. Lab., Commonwealth Sc. & Ind. Res. Organisation, Melbourne). *Nature*, 1950, **165**, 516-517. Australian flax compares very unfavourably with Belgian flax, due largely to the Australian climate, and to the labour employed being inexperienced. Laboratory investigations have, however, indicated that factors associated with retting are equally significant. These are outlined and it is stated that in some cases Australian flax can yield a much better fibre than that obtained hitherto. It was found that the bacterium *Clostridium felsineum*, which is very active in the retting of Belgian flax and gives a rapid and complete ret with a yield of clean lustrous fibre, was present in only a few of about 50 Australian rets, and then formed a small part of the retting flora. A small sample of Australian flax retted in Belgium in a tank with a large quantity of Belgian flax gave a much higher grade fibre than when retted in Australia, indicating that it had benefited by the bacteria of the Belgian grown flax. These investigations are being continued with the object of finding an economical method of introducing efficient bacteria into commercial retting in Australia. L—**2A.**

Retting, Drying and Scutching: New French Method. *Linen Trade Circular*, 1950, **36**, No. (Feb. 4), 11. Details of the work on flax processing carried out by the Technical Committee of the Association des Producteurs de Lin are mentioned. A scutching method is said to have been evolved in which no tow is produced. Tow comes out in the hackling process. The results so far have been satisfactory. As regards retting, a new chlorine process allows pulling, retting, drying, and scutching to take place in two hours. Experiments with 50 kilo lots are said to have been satisfactory even up to the finished cloth. Experiments on a larger scale are in hand. It remains to be seen if these new processes are practicable on an industrial basis. L—**2A.**

"Syton": Use in Cotton Spinning. ("Effect of Oil Spraying on Cotton and Spinning Process.") *Indian Textile J.*, 1950, **60**, 311-313. Syton W-20 is a colloidal dispersion of silica in water. Spraying "Syton" on cotton before spinning has been investigated. Results are tabulated to show that the treatment makes it possible to spin yarns at lower twist factors but equal in strength, with

a corresponding increase in production. Improved spinning efficiency and more even yarn are also claimed. C—**2A.**

Roving Frame Erection Equipment. ("How to Move Ten Roving Frames in Eight Hours.") C. H. Leach. *Textile World*, 1950, **100**, No. 2, 132-133. Simple equipment is described and illustrated which can be used to move roving and spinning frames, *etc.*, without dismantling. It consists of units of steel framework, mounted on castors, with lifting tackle attached. C—**2A.**

(B)—Spinning and Doubling

Electrically-driven Woollen Mule. ("Woolen Mule is Electrically Driven.") G. Josephy's Erben, Linz, Austria. *Textile World*, 1950, **100**, No. 4, 260. A mule driven by two electric motors and featuring a continuous increase in spindle speed during winding of the bobbin is described. Other features include a friction coupling designed to ensure shockless starting and smooth running, resistances inserted into the motor circuit to impart all necessary speeds to the spindles, and an articulated control rod working in conjunction with the resistance in the twist-imparting circuit for increase in spindle speed, which may be varied continuously from 1,200 to 5,500 r.p.m. Towards the end of the carriage run, the spindle speed is instantaneously increased to assist the quadrant while the fallers change to their spinning position. W—**2B.**

Pot-spinning System: Increased Production. E. H. Helliwell. *Text. World*, 1950, **100**, No. 4, 124-125, 218. Controlled centrifugal action is the main principle employed in the operation of new pot-spinning frames produced at the Abbott Worsted Co., Lowell, Mass., plant. The need for rings, caps, travellers, tapes and cylinders is eliminated. Doffing is performed by allowing a thin coiled aluminium sheet to expand inside the pot and contact the inside of the package. In piecening up, the free end is simply inserted into the top of the guide tube feeding the yarn into the pot. W—**2B.**

High Drafting and the Ambler Super-draft System. G. H. Ambler and M. Hannah. *J. Textile Institute*, 1950, **41**, P115-P123. The Ambler Super-draft System and the theory of high drafting on which it is based are described. A full account of the theory appears in *J. Textile Institute*, 1950, **41**, T57-T123. An ordinary worsted spinning frame, with its spindles and front rollers, forms the basis of the system; the back rollers are replaced by pairs having a flanged bottom roller, positively driven, and a spring loaded top roller running freely. Each frame is provided with a bar on which the super-draft units are mounted, and which also carries the driving shaft for the gear wheels in the units. Each super-draft unit consists of four parts, *viz.* the twist stabiliser, the fibre guide, a pair of tension rollers and the flume. Drafts of 110 for cotton, 250 for wool, 1,000 for long staple rayon have been obtained experimentally on a worsted frame, and up to 150 are in use for producing commercial yarn. Essentials of high drafting are control of twist and tension, and the correct placing of the unit relative to the front rollers is emphasised. W—**2B.**

Ambler High Draft Patent. A. F. Barker. *Text. J. Australia*, 1950, **24**, 972-982, 1058-1060. The author discusses the method by which he thinks inventions should evolve in the textile industry, and refers to the Ambler Super-draft System in his discussion. W—**2B.**

Wool Spinning: Use of Syton. R. F. Nickerson. *Amer. Wool and Cotton Rep.*, 1950, **64**, No. 12, 14-15. Some improvements resulting from the use of Syton (a stable dispersion of nearly pure silica in water) include spinning to higher counts, reduction in fly waste, production of loftier yarns, and usefulness in the processing of wool/rayon blends. W—**2B.**

Flax Spinning: Part II, Machinery and Equipment; Chap. IV, Hackling. A. V. Pringle. *Fibres, Fabrics & Cordage*, 1950, **17**, No. 2, 58-64. Cutting or breaking flax is described, and the different operations carried out in hand hackling—piecing, roughing, dressing and sorting—are outlined briefly. The development of the hackling machine is traced, and various types of machines are described. A detailed account is given of the design and operation of the modern hackling machine. Several diagrams are included. L—**2B.**

Ring Frame: Efficiency. ("Frame Efficiency Figures Can Show Up Source of Losses.") H. P. Lynch. *Textile World*, 1950, **100**, No. 2, 145, 234, 236, 238. The attainment and maintenance of high efficiency on ring frames is discussed.

Regular statistical checks are recommended and several examples are given to show how efficiencies can be calculated. Factors affecting adversely spinning production efficiency are tabulated. C—**2B.**

Knitting Yarns: Effect of Humidity. ("The Importance of Humidity in Textile Manufacture.") J. Pollitt. *J. Textile Institute*, 1950, **40**, P1-P6. The effects of humidity on certain yarn properties which influence knittability are described. The factors dealt with include coefficient of friction, breaking load and extensibility, and flexural rigidity. The variations of these properties with humidity are shown graphically for several natural and artificial fibres. C—**2B.**

Rayon Yarns: Processing; Effect of Humidity. ("Relative Humidity and Rayon.") E. Cotterill. *J. Textile Institute*, 1950, **40**, P9-P15. The effects of humidity on the processing of rayon yarns are discussed. Reasons for providing controlled atmospheric conditions and water imbibition values for various yarns are first presented. The influence of humidity on stress/strain relationships (including recovery from stretching) and on twist (torsional rigidity) is discussed, and moisture regain and various stress/strain curves for viscose and cellulose acetate are given. Finally some recommendations are made on humidity control at various stages of rayon fabric production. C—**2B.**

(C)—Subsequent Processes

Cotton Tyre Cord Variable Rate Stretching Device. ("Tire-Cord Uniformity Improved by Variable Stretching.") W. M. Scott. *Textile World*, 1950, **100**, No. 2, 153, 242, 244. A new apparatus for stretching tyre cord has been developed. Constant tension is applied to the cord by suspended weights, movement of which controls a variable speed unit so that the cord is always stretched in direct proportion to its original extensibility. Cords stretched on this device and tested on Scott tyre-cord testers have been found more uniform than cord stretched by the constant-rate stretching method. C—**2C.**

Wet Spun Yarn in Cheese Form: Drying. *Linen Trade Circular*, 1950, **36**, March 25, 16. A new continuous travelling type of drying machine, developed by A. N. Marr, Ltd., is described. The cheeses are threaded on to metal rods which are traversed through a chamber in 10 tiers. Warm air is circulated round them at an average temperature of 180° F. The cheeses are always moving, and are turned whilst passing from tier to tier. Uniform results are obtained. L—**4E.**

(D)—Yarns and Cords

Knitting Yarns: Storage and Handling. C. Reichman. *Canadian Text. J.*, 1950, **67**, No. 7, 56, 59. Ideal conditions for yarn storage and handling are stated. The yarn, whether in skeins or on cones, should be stored in a room which is neither too hot nor too dry, or, preferably, in an atmosphere of relative humidity of about 60 per cent. Other suggestions include frequent dusting with a mothproofing agent, good air circulation to prevent mildew, wooden shelves in preference to steel shelves, the absence of direct sunlight, storing at a distance from the knitting department to prevent the accumulation of fly, and careful handling to prevent damage to cones. W—**2D.**

Yarn Storage and Handling. *Wool Record*, 1950, **77**, 1127, 1129, 1131. After pointing out the advantages of storing raw wool in preference to yarn, the author describes factors affecting the storage of yarns (temperature, humidity, exposure to light, animal pests, mildew, *etc.*), and discusses the optimum conditions for yarn storage. Some suggestions for successful handling of yarn are included. W—**2D.**

Woollen and Worsted Manufacture: Accent on Novelty. *Wool Record*, 1950, **77**, 897-899, 959-963. The manufacture is described of the following novel yarns: a yarn for a high-class tropical cloth; a "corkscrew" yarn; a hand-knit crêpe yarn; a combined woollen and worsted yarn; nep yarns; a compound knop and print effect yarn in black and white medium worsted crossbred, produced on a special machine; a gimp yarn produced on a modified machine; a spot effect yarn for machine knitting. W—**2D.**

Patents

High-frequency Twist-setting Device. Industrial Rayon Corporation. B.P. 625,096 of 17/9/1945: 22/6/1949 (Conv. 26/4/1944). The snarling tendency ("liveliness") of twisted monofils and yarns in package form is reduced by subjecting the packages to the action of a high-frequency field. The 29 claims cover textile fibres of all the main types, natural and artificial. The packages

are mounted between the electrodes and may be carried on an endless chain. They may also be wrapped in paper, singly or in sets. The advantages claimed are (1) the shortness of the exposure (a few minutes) and (2) the possibility of treating very large packages. C.

Hydraulic Ram Traverse Mechanism for Spinning and Winding Machines. Courtaulds Ltd., Geoffrey Curtis and A. A. Atkins. B.P.626,177 of 21/5/1947: 11/7/1949. A machine for building tapered packages of yarn has a traversing mechanism that includes a hydraulic ram for producing to and fro movement between the yarn holder and the thread guide. Valve-controlled mechanism varies the rate of feed of liquid to the ram during each stroke so as to produce a corresponding variation in the traverse, and the valve is actuated by a reciprocating member carried by the ram. C.

Drafting Mechanism Saddle Weighting Device. Casablancas High Draft Co. Ltd. and Joseph Noguera. B.P.626,397 of 9/4/1947: 14/7/1949. A roller weighting device for use on drafting mechanism having at least three pairs of rollers consists of a first saddle that bears on the top rollers other than the front one and a second saddle that bears on the front top roller and on the first saddle. The second saddle can be displaced to the rear and retained by the inter-engagement of co-operating parts of the saddles so as to liberate the front top roller for removal. Means are also provided for transmitting a weighting pressure to the second saddle so that when in the rear position this saddle can still apply pressure on the first saddle. The illustration provided shows the device fitted to the Casablancas high-draft system. C.

Cyclone Fibre Spinning Apparatus. M. S. Mayo. B.P.626,652 of 23/7/1946: 19/7/1949 (Conv. 23/7/1945). The invention relates to a method and apparatus whereby cotton or other fibres are removed from a bale by an air blast and conveyed into an apparatus that includes a conical cyclone chamber from which they emerge as an assembly of cleaned and parallelised fibres ready for twisting into a yarn. C.

Anti-dust Mask. Auguste Lemaire. B.P.626,927 of 13/6/1945: 25/7/1949 (Conv. 19/6/1944). A mask for the nose and mouth comprises a pouch formed of filter gauze sewn to a "flexible sealing member" (a roll of cloth) by which the mask adjusts itself to the face, and fitted with adjustable cords for securing the mask to the head. C.

Gill Drawing Frame. Riccardo Scarani. B.P.626,953 of 2/7/1946: 25/7/1949 (Conv. 23/1/1943) and 627,300 of 3/7/1946: 5/8/1949 (Conv. 2/4/1943). The inventions relate to a gill drawing frame providing slow working feed and more rapid return of the fallers. (1) The working feed is imparted to the fallers by a set of toothed wheels and the return movement is imparted by a further set of toothed wheels having a higher circumferential speed. The entry of the fallers to the working path and their discharge from it are effected by the pressure of succeeding fallers in co-operation with inclined guides. (2) Supplementary star wheels are used to support the fallers immediately prior to their entry into the working path and immediately after their discharge. C.

Level-dyeing Doubled Continuous-filament Yarns: Production. British Celanese Ltd. B.P.627,058 of 17/10/1946: 27/7/1949 (Conv. 17/10/1945). A particular method of doubling continuous filament yarns so as to mask the "shoulder effect" (see B.P.623,753[1]) consists in guiding two freshly spun yarns to points on a winding package that are always spaced from one another axially and traversing them to and fro along the package over a distance greater than the spacing between the points so that neither yarn is exposed at both shoulders of the package, and removing the two yarns together (on an uptwister) so as to form a doubled yarn in which portions of the components that occurred at the shoulders are staggered in the doubled yarn. ([1]*J. Textile Institute*, 1950, **41**, A178.) C.

Pneumatic Broken End Catching Device. Sulzer Frères Soc. anon. B.P. 627,075 of 27/1/1947: 27/7/1949 (Conv. 9/2/1946). A device for catching broken ends on a spinning, doubling or winding frame comprises an opening through which a jet of air is directed to one side of the running thread and an opposite opening connected to an air-flow passage into which the end is blown. The blast opening may be connected to the high-pressure part and the reception opening to the low-pressure part of a Venturi device operated from the ventilating equipment of the machine room. C.

Nylon and Other Plastic Ring Travellers. Clark Thread Co. B.P.627,157 of 8/7/1947: 29/7/1949 (Conv. 2/3/1942; 627,370, 627,371 and 627,372 of 21/7/1947: 8/8/1949 (Conv. 31/3/1942); 627,373, 627,374 and 627,375 of 25/7/1947: 8/8/1949 (Conv. 31/3/1942). These seven inventions relate to the use as cast or moulded ring travellers, without metal parts, of (1) nylon, (2) plasticised cellulose ester, (3) a vinyl ester polymer or co-polymer of vinyl acetate and chloride, (4) an acrylic polymer, (5), polystyrene, (6) a vinylidene chloride polymer, and (7) a cellulose ether (*e.g.* ethylcellulose). C.

Condenser Card Rubbing Aprons. Andre Rubber Co. Ltd. and Henry Clements. B.P.627,274 of 28/1/1947: 4/8/1949. A rubbing apron for a condenser card comprises a moulded endless belt having an outer surface of rubber or synthetic rubber, ground, and an inner surface provided with locating bosses or projections parallel with one or both edges. The outer surface may be formed with a series of helical grooves. C.

Cotton Blowroom Pneumatic Conveying and Distributing Apparatus. Tweedales and Smalley (1920) Ltd. and Norman Pilkington. B.P.627,334 of 22/2/1947: 8/8/1949. Apparatus for pneumatically conveying cotton from a feeding or opening machine and distributing it to other multiple opening or lap-forming machines comprises a junction structure or distributor into which the cotton falls and which is divided by a partition into two longitudinal compartments, which are alternately open at one end to the atmosphere and connected at the other end to fan-controlled pipes through which the cotton is drawn into the hoppers of two lap-forming machines. The junction structure is controlled by solenoid-actuated valves and control plates suspended in the lap-forming machines so that the feed is uniform. C.

Spinning and Twisting Frame Flyer. James Mackie & Sons Ltd. and J. P. Mackie. B.P.627,355 of 3/5/1947: 8/8/1949; 627,961 of 3/5/1947 and 29/4/1948: 18/8/1949. The claims are for a flyer having a cylindrical body portion comprising separate legs supported from a wharve at the top and connected by a ring at the bottom, and a projecting lip on one leg in such a position that the yarn can be passed within the lip in travel down the leg to an eyelet at the base of the flyer. The legs are bent down and shaped so as to form part of a cylindrical surface. They may hang straight or diagonally. The flyer may be pressed from sheet metal. C.

Ring Frame Lifting Rod Mechanism. Dominion Textile Company Ltd. B.P. 627,510 of 17/9/1946: 10/8/1949 (Conv. 7/5/1946). To prevent clogging of the vertical bearing sleeves in which the lifting rods of a ring frame slide, the rods are made with flattened or incurved portions (*e.g.* three flat portions) so that clearance spaces through which "fly" can escape are provided between the rods and their sleeves. C.

Composite Drafting Roller. E. J. Courtney. B.P.627,516 of 6/11/1946: 10/8/1949 (Conv. 4/4/1946). The invention relates to a drafting roller constructed of hollow component parts like box lids which are screwed and spot-welded together, with distance pieces providing a range of roller widths. The outer flanges hold the roller covering. C.

Card Clothing. E. A. Snape, Jr. U.S.P.2,488,442 of 15/11/1949. Card clothing backing consists of layers of cotton or linen fabric cemented together, a layer of wool felt being cemented to the outer surface of the fabric, and a sheet of flexible plastic material being cemented to the outer surface of the felt. The wire, which has an oval cross section, is in the form of staples with parallel legs. The staples are mounted with the major axes of the legs parallel and extending in the direction of movement of the wires, the minor axes enabling close spacing of the legs of the staples across the clothing. The backing is resilient and is resistant to oil and water. The accumulation of fibres in and around the wire is claimed to be reduced to a minimum. W.

3—CONVERSION OF YARNS INTO FABRICS

(A)—Preparatory Processes

Dressing Frames: Variable Speed Drive for— Sjostrom Machine Co., Lawrence, Mass. *Textile Industries*, 1950, **114**, No. 1, 165, 167, 169. A new attachment for driving and controlling dressing frames for woollens and worsteds is described. Features of this include an adjustable brake which brings the reel to a quick stop in any desired distance (for location of broken ends), and easy start and stop (for reduction of yarn breakage). W—**3A.**

Automatic Pirn Winder. Harrison Knitting & Textile Manufacturing Co. Ltd. *Brit. Rayon & Silk J.*, 1950, **26**, February, 62. Some improvements to the Harrison automatic pirn winder[1] are briefly described and illustrated, including mechanical improvements in reciprocating or guiding parts, adjustable traverse lengths and a new triple-disc tensioning device. ([1]*J. Textile Institute*, 1948, **39**, A131.) C—**3A.**

"Britoba" Pirn Winder. Muschamp Taylor Ltd. *Textile Mercury & Argus*, 1950, **122**, 549-551. Illustrations are given of a new automatic machine that winds four pirns simultaneously at speeds up to 6,000 r.p.m., and has only one automaton, one automatic bunch builder, one diameter control mechanism and one traverse cam. A new development is a tail cutting device operated by cam and ratchet from the diameter control mechanism. C—**3A.**

Nylon Yarns: Tying and Pirning. ("Tricks Speed Nylon Tying and Quilling.") H. E. Wenrich. *Textile World*, 1950, **100**, No. 2, 147, 233, 234. Some hints are given for the acceleration of the tying of warps and pirning when using nylon yarn. They include the over-sizing and light brushing of the ends to be tied and careful tension control and oiling (for harsh yarn) during weft winding. C—**3A.**

Nylon Yarns: American Methods of Processing. H. Marsden. *Brit. Rayon and Silk J.*, 1950, **26**, March, 52-56, 94; *Silk and Rayon*, 1950, **24**, 528-537; *Textile Manufacturer*, 1950, **76**, 152-158. A comprehensive survey is made of American methods of nylon yarn processing for the hosiery industry. Details of the more important nylon yarns are tabulated (including denier, twist, and price per lb.). The following processes are dealt with individually: (1) Winding uptwister bobbins from suppliers' "pirns"; (2) Uptwisting; (3) Twist-setting; (4) Single end sizing or gumming; (5) Lagging in the controlled air conditions of the sizing room; (6) Lagging in the controlled air conditions of the coning room; and (7) Pineapple coning with oiling. The main features of the machinery used at each stage are described, and some of these are illustrated. C—**3A.**

Rayon Pirn: Defects in Winding. ("Défauts à la formation du talon de la canette.") F. Sonck. *Rayonne*, 1950, **6**, No. 1, 95, 97, 99. The writer discusses two defects in the formation of the base of the cop, encountered in winding rayon with Leesona or ARCT pirn-winders employing feeler disks. The mechanism of the feeler-disk is described and illustrated. The first defect, the bottle-shaped cop, occurs when the height of the base is smaller than the distance covered by the feeler-disk and the thread guide. The second defect, the cushion cop, is the opposite of the first, i.e. the base is greater than the traversing distance. Practical hints for ensuring perfect cop formation are given. C—**3A.**

(B)—SIZING

Continuous Size Cooking Plant. ("Direct Steam-Injection Continuous Starch-Cooker.") L. W. Rainard and G. Zanolli. *Textile Research J.*, 1949, **19**, 822-825. A simple, direct steam-injection type of starch-cooker has been made from standard piping on a pilot scale. The operation and advantages of the system are discussed and illustrated. Characteristics of pastes produced with this type of cooker are also discussed. C—**3B.**

Warp Sizing: Mill Investigations. ("Sizing Research.") D. A. Whitehead. *Textile Weekly*, 1950, **45**, 858-862. A report of a lecture on the planning of mill investigations with the object of reducing warp breakage. Reference is made to the determination of the optimum size concentration, size analysis, and recording warp breaks in weaving, including the use of tinted thrums and the method of the Cotton Manufacturing Commission. C—**3B.**

Experimental Sizing Machine. ("Miniature Slasher Features Versatility.") West Point Foundry & Machine Co. *Textile Industries*, 1950, **114**, No. 2, 175-176. A brief illustrated description is given of a miniature multi-purpose sizing machine. Yarn is taken directly from the creel, through the sizing apparatus, and wound on to a special beam in the form of a ribbon. The beam consists of a series of narrow spools or sections on each flange of which is a patented notch and slot arrangement. This facilitates the transfer of the warp from one section to the next as the sections fill up. The machine enables different sizing mixtures to be tried out on one warp and by incorporating three forms of drying (hot air, radiant heat, and infra-red radiation) it also enables the effects of these drying methods to be studied. C—**3B.**

Pearl Starch Size: Production and Application. ("Pepperell Uses Pearl Starch.") Pepperell Manufacturing Co. *Textile Industries*, 1950, **114**, No. 2, 89-92. An improved system of sizing used by the Pepperell Manufacturing Company is described and illustrated. Features include the use of the Gaulin Homogenizer, pearl starch and a liquid sizing compound. The practice employed is outlined and general information on results, *etc.*, is given. C—**3B.**

(C)—WEAVING

Automatic Looms for Fancy Woollen and Worsted Weaving. D. C. Snowden. *Fibres*, 1950, **11**, 129-134. Automatic weft supply methods and mechanisms are discussed. Photographs and descriptions of several automatic looms are included. W—**3C.**

Four-colour Bobbin Changers Usable on Worsted Looms. Stuer Automatics. *Textile World*, 1950, **100**, No. 1, 132. A new automatic bobbin changer suitable for woollen and worsted looms is described. It will handle four different colours, and consists of an upright magazine which will hold up to 46 bobbins. Both right-hand and left-hend magazines may be obtained, thus the magazine is always on the driving side, and there is a device for preventing the transference of a wrong colour. W—**3C.**

Automatic Looms. *Linen Trade Circular*, 1950, **36**, Feb. 25, 16. In a talk to the Foremen Loom Overlookers' and Managers' Association in Belfast, Mr. Gaudin (British Northrop Loom Co.) said that widespread interest was being taken in automatic looms to-day owing to scarcity of weavers, upward trend of wages, money available, and re-equipment of factories. He reviewed the development of the loom from early times, and said that in this country one weaver can look after 40 looms. In America the number may be 80-100, or more, per weaver. With automatic looms efficiency at every stage can be measured, and output can be prophesied months ahead. L—**3C.**

"Universal" Shuttle Truing Machine. ("Shuttle Maintenance.") Stäubli Bros. and Co. *Brit. Rayon & Silk J.*, 1950, **26**, February, 60-61. An illustrated account is given of the construction and operation of the Stäubli "Universal" shuttle truing machine for planing, polishing, grinding, turning and drilling. C—**3C.**

Fully Automatic Overpick Loom. Butterworth and Dickinson Ltd. *Textile Recorder*, 1950, **67**, March, 70-71. A brief illustrated description is given of an automatic shuttle-changing loom for weaving cotton fabrics. Apart from the sley and weft-replenishing mechanism the loom is identical with the firm's non-automatic cotton looms. A metal sley is employed and other features include a safety device to ensure correct shuttle change and a mechanical warp stop motion. Models with reedspace up to 72 in. are available. The magazine holds 10 shuttles representing about 2½ hours continuous operation (using 24s weft, 42 in. wide cloth and a speed of 190 picks per minute). C—**3C.**

Negative Dobby Shedding Motions. W. M. Middlebrook. *Textile Manufacturer*, 1950, **76**, 119-121. An illustrated technical description is given of the single-lift dobby, the centre shed dobby and the Blackburn dobby. C—**3C.**

Plain Loom Shedding Motion. ("Die Fachbildung bei Leinwandbindung an Aussentritt-Exzenterstühlen.") R. Mathes. *Kunstseide u. Zellwolle*, 1949, **27**, 239-242. The formation of tangles in plain weaves is discussed. A new type of shed formation employs four healds and two pairs of tappets, the first pair elliptical in shape, the second circular. The first heald, driven by the elliptical tappet, stands higher and has the greater lift. The second one, driven by the circular tappet, follows it but does not reach it. When both healds have reached their respective highest points, the second one is the first to move back. The new method is discussed and illustrated and compared with the old one, in which the first heald was overtaken by the second one. C—**3C.**

"Vesta" Warp Let-off Motion. Vesta Products. *Textile Recorder*, 1950, **67**, March, 82-83; *Brit. Rayon & Silk J.*, 1950, **26**, March, 71, 78. An illustrated description is given of the "Vesta" warp let-off motion. Tension is applied to the ruffle chain by means of a strong spiral spring the state of compression of which is controlled by a hand-wheel working on the threaded lower portion of the chain hook. The assembly is journalled in a hinged casting which when raised releases all tension on the chain. A modified version of the device incorporates a simple compensating system which ensures even tension should the beam have a slight eccentric motion (due to wear, *etc.*). C—**3C.**

Loom Sley: Movement in Weaving. ("Die Ladenbewegung am Webstuhl.") Hans Keller. *Textil-Rundschau*, 1949, **4**, 332-333. The effect of the length of the crank shaft on the movement of the sley and thus on loom efficiency is investigated. It is shown that a long crank-shaft is advantageous for high-speed looms, whereas a shorter crank shaft is to be preferred for slow-running Jacquard looms, particularly when delicate materials (rayon) are being woven. C—**3C.**

Reed Wires: Uneven Spacing; Examination. I. Laird. *Textile Manufacturer*, 1950, **76**, 69-72; 129-133. An illustrated discourse on reed-wires. Air space/ wire space ratios are discussed and forms of construction of reeds are described. Possible causes of irregular reed wire spacing are listed and reasons for the regularity of all-metal reeds are pointed out. Occasional examination of reed wires is recommended and some methods of inspection are described. These include expert visual inspection, inspection by means of a reed viewer, microscopic examination, and inspection by photographic means. With the reed viewer a reed of known regularity is used as a standard of comparison. In the photographic method, the reed is placed on a contact-paper in subdued light and illuminated. In this way an exact photographic reproduction of the reed-wires and their spacing is obtained. The enlargement of these contact prints is discussed and the reflex-photographic method of obtaining prints is also described. The reflex method does not give as clear results as the direct contact method. The inspection of reeds by means of superimposing standard reeds or glass gratings is dealt with and inspection by projection lantern and epidiascope are also mentioned. Many illustrations are given showing the various methods and their results. C—**3C.**

(D)—KNITTING

Knitting Machine Driving Motor Torque Control. ("Modified Circuit Improves F.F. Machine Operation.") E. H. Helliwell. *Textile World*, 1950, **100**, No. 2, 135, 242. A modified motor circuit has been designed for knitting machine motors whereby the torque is automatically adjusted to the load. The device eliminates slow running and starting-under-load difficulties. The circuit is briefly described and illustrated. C—**3D.**

"Vari-pattern" Half-hose Knitting Machine. Hemphill Co. *Brit. Rayon & Silk J.*, 1950, **26**, February, 66. A brief illustrated description is given of the Hemphill model HTF-49, "Vari-Pattern" knitting machine for the production of half-hose with elastic top. A feature of the machine is individual and independent control of the pattern on each of the two feeds. C—**3D.**

Knitted Plush: Production. J. B. Lancashire. *Brit. Rayon and Silk J.*, 1950, **26**, March, 60-63. Technical details are given for the production of knitted plush fabrics. The mode of operation of a new plush knitting machine made by the Supreme Knitting Machine Co. Inc. of America, is described. Some illustrations are given. C—**3D.**

(F)—SUBSEQUENT PROCESSES

Sewing Machine Needle Cooling Device. ("Dry Needle Cooling in Heavy-duty and High-speed Sewing Operations.") *Textile Research J.*, 1949, **19**, 833-834. H. F. Hume and T. O. Lee (of E. I. du Pont de Nemours & Co. Inc.). Drawings are given of a cooling head supplied with air at 50 lb. sq. in. for cooling a sewing machine needle when working on leather. The control valve is connected with the treadle. With its aid it was possible to sew several thicknesses of Orlon awning fabric with nylon thread. C—**3F.**

(G)—FABRICS

Colour in Woollens and Worsteds. D. R. Christie. *Fibres*, 1950, **11**, No. 3, 83-85. A general review on the combination of different coloured materials includes mixing of fibres and yarns, the use of twisted yarns, which may be two, three or four fold, weaving of tartans, checks, and other fancy designs, and knitting of Fair Isle patterns. Twisting together threads of unequal thickness as, for example, wool and silk, mercerised cotton and rayon, is described. Methods of combining different colours to obtain brilliant or subdued effects are discussed. W—**3G.**

Synthetic Fibres in the Woollen Industry: Scope. E. Dobbins. *Canadian Textile Journal*, 1950, **67**, No. 3, 44-46. Some characteristics of synthetic fibres which should make them valuable for utilisation in the woollen industry are dis-

cussed, and possible methods for combining the two fibres are suggested. The use of special finishes on the resulting fabrics is advocated. W—**3G.**

Trimmings: Production. A. Thompson and Sigfrid Bick. *Brit. Rayon & Silk J.*, 1950, **26**, February, 46-48. The constructions of eleven types of trimmings are illustrated and briefly described. They include fringes made on an ordinary narrow loom, or on a loom with a special mechanism which twists the cords in the fringe, or on the Sander and Graf machine; materials woven on four shafts; novel effects, including lace-like structures, produced on the Sander and Graf machine; braids; and cords. C—**3G.**

Vicara Fibre Blends: Development. J. H. Karth. *Rayon and Synthetic Textiles*, 1950, **31**, No. 2, 65-66. The general properties of Vicara (regenerated protein) are briefly outlined—physical properties and the effects of chemicals, heat, light, insects, dyeing, *etc.* Some blends of Vicara with wool, cotton, silk, ramie and artificial fibres are listed and notes are added on the types of fabrics woven from such blends. C—**3G.**

PATENTS

Drop-box Loom Stop-rod Motion. Thomas and J. R. Hindle (Hindle, Son & Co. Ltd.). B.P.626,250 of 28/5/1947: 12/7/1949. A drop-box loom in which the sley is provided with a spring-actuated stop rod carrying feeler levers that are actuated by the shuttle-box swells is fitted with means by which the pull or pressure of the stop-rod spring is reduced during the box changing movement until shortly after the shuttle has been picked so that the friction caused by the feeler levers pressing on the swells is reduced to a minimum during the box change. The full pressure or pull is restored while the shuttle is crossing the loom. C.

Loom Shuttle Checking Device. Tom Butterworth, George Whittaker and Harry Eastwood. B.P.626,348 of 23/11/1946: 13/7/1949. A device for checking the flight of a shuttle comprises a boss that is rotatable on a fixed stud and has an inclined face which works in conjunction with an inclined face on another, spring-loaded boss that is slidable but not rotatable on the stud. The rotatable boss is attached by a short arm to one end of a short strap which is attached at its other end to the check end strap or is slidable on the picker spindle. Means are provided for adjusting the resistance that the arm offers to a turning movement. C.

Shuttle Tip. McGregor & Balfour Ltd., D. D. McGregor and E. M. Sparrow. B.P.626,409 of 18/6/1947: 14/7/1949 (Addition to B.P.607,584). The original shuttle tip is modified by dispensing with the steel ball for opening out the prongs. These are now made with a V-notch at the pointed end, of such a form as to provide a pair of opposed scoops. (See *J. Textile Institute*, 1949, **40**, A146.) C.

Electronic Warp Stop Motion. W. W. Triggs (for Crompton and Knowles Loom Works). B.P.626,496 of 1/10/1946: 15/7/1949. An electromagnetic device that operates to stop the loom when a drop wire makes connection is included in an electric circuit with an electronic tube having a control grid that normally maintains the tube and circuit inoperative but operates, through a change in grid potential when a drop wire falls, to complete the circuit through the electromagnetic device. There are 13 claims and a circuit plan is provided. C.

Yarn Package Compactness Testing Instrument. British Celanese Ltd. B.P. 626,511 of 21/3/1947: 15/7/1949 (Conv. 21/3/1946). A device for testing the firmness and density of yarn windings on a package comprises means for firmly holding the package, a pointed rod that can be pneumatically driven at an accurately controlled angle into the package with pre-determined force, and means for indicating the depth of penetration. The testing means can slide along parallel guide rods for making a series of tests at different places in the package. C.

Constant Speed Cone Winding Machine. Courtaulds Ltd. and J. I. Brown. B.P.626,587 of 22/7/1947: 18/7/1949. A coning machine characterised by constant peripheral speed of winding comprises a positively driven spindle for the cone and a thread guide riding on an arm against the cone so that as the cone grows the spindle is intermittently displaced sideways to a position where it is driven at a corresponding lower speed. The displacement is by one tooth at a time of a pawl and ratchet mechanism and the spindle drive is by means of a pair of friction discs that serve as continuously variable gearing. C.

Loom Let-off Motion. Dan Walker. B.P.626,674 of 14/11/1946:19/7/1949. The invention relates to a negative let-off motion of the brake type, without weights or levers, comprising a rubber band with a lining of cotton rope, encircling the warp beam collar and anchored to the main frame of the loom. C.

Electromagnetic Loom Picking Mechanism. Jan Forman. B.P.626,719 of 10/10/1946:20/7/1949. The claim is for a relatively silent, high-speed loom in which a ferromagnetic and/or conductive paramagnetic (copper, aluminium or silver) part is provided in the "shuttle" and acceleration and retardation of the "shuttle" are effected by means of coils that are energised, through condensers, in pre-determined directions and at pre-determined intervals. Circuit plans are shown. C.

Full-fashion Knitting Mechanism. F. B. Dehn (for Textile Machine Works). B.P.626,934 of 9/1/1946:25/7/1949. The invention relates to pawl and ratchet wheel mechanism for operating the narrowing head mechanism of full-fashion knitting machines. There are 20 claims and details are shown in six sheets of machine drawings. C.

Bottle Bobbins. Arthur Barraclough. B.P.626,656 of 17/8/1946:19/7/1949. The bobbin comprises a metal or plastic sheath or shell and a central core, each consisting of a cylindrical upper part and a lower conical part. The sheath and core may be taken apart as required. Increased grip between them is secured by covering the inner surface of the sheath and outer surface of the core with cork or leather. The outer surface of the conical base of the sheath may be stepped or roughened. The core has an axial bore for a spindle and the base of the core has keyways for driving. C.

Circular Latch Needle Knitting Machine Stop Motion. G. Stibbe & Co. Ltd., E. V. Stibbe and A. M. Brown. B.P.626,961 of 1/8/1946:25/7/1949. The invention relates to mechanism for detecting the abnormal positioning of latches and stopping the machine in consequence. It is designed for power-driven circular latch needle knitting machines, especially those used for seamless hosiery. Details are shown in four sheets of machine drawings. C.

Straight-bar Knitting Machine Carrier Driving Mechanism. William Cotton Ltd. and W. G. Macdonald. B.P.627,244 of 14/3/1945:4/8/1949. The claim is for means to absorb the shock if the carrier rod of a straight-bar knitting machine (*e.g.* Cotton's patent) strikes a fixed part of the machine. The recess of the driving lug that houses the driving bolt has at least one wall spring-mounted. Details are shown in six sheets of machine drawings. C.

High-speed Automatic Pirn Winding Machine. A. F. Burgess (for Barber Colman Co.). B.P.627,312 of 3/10/1946:5/8/1949. The invention consists in a machine for winding weft packages in which a traversing device is moved axially of a winding spindle by a feed mechanism having a disengageable connection with a drive shaft, the feed being initiated by a control mechanism that includes a member (A) for engaging the driving connection, following which engagement the movement of (A) is interrupted by means included in the control mechanism. This mechanism also includes means, automatically responsive to the completion of the package, for re-starting the movement of (A) and disengaging the connection. Details are described with the help of 15 sheets of machine drawings under the headings: the machine in general, bobbin holding means, yarn supply, empty bobbin supply, donning side, fastening strand to new bobbin, bunch builder, main traverse, filled bobbin disposal, strand positioning device, drive mechanism, control mechanism, and operation. C.

Creeled Yarn Package Support. British Celanese Ltd. B.P.627,506 of 1/8/1946:10/8/1949 (Conv. 1/8/1945). The invention relates to a form of yarn package support (bobbin, *etc.*) that can readily receive a "magazine wrap" or "transfer tail" from another package so that an uninterrupted flow of yarn may be maintained from a series of packages, *e.g.* on a creel. It comprises a barrel having a conical base, surmounted by a cylindrical stem with a flange at its end, and the cylindrical part protrudes through the conical base to form a projection to which the magazine wrap or transfer tail is attached. Two alternative embodiments of the invention are illustrated. C.

Disc Yarn Tensioning Apparatus. Raymond Dewas. B.P.627,567 of 20/5/1946:11/8/1949 (Conv. 26/3/1946). The claim is for a yarn tensioning apparatus that will maintain constant tension even when the yarn is irregular in thickness.

It comprises one or more disc tensioning devices each of which has a fixed ring support (A) and apertured lower disc (B) that can revolve freely on (A), a fixed spindle (C) coaxial with (A) and (B) and located with its lower end above the upper plane of (B), an apertured upper disc (D) that can revolve freely on (C), means for limiting the upward movement of (D) and means for guiding the yarn in a straight line between discs (B) and (D) or each of the disc tension devices. C.

Gripper Shuttle Loom Picking Motion. Sulzer Frères Soc. anon. B.P.627,603 of 22/11/1946: 11/8/1949 (Conv. 24/11/1945). A loom of the gripper-shuttle type has on the picking side of the warp shed a pull-back device, operated from the loom drive, for drawing out a loop of weft so as to impart tension to the picked thread and also to draw weft from the external package. C.

Diagonal Wrap Patterns: Knitting on Circular Independent Needle Machines. Hemphill Co. B.P.627,626 of 4/2/1947: 12/8/1949 (Conv. 13/2/1946). A wrap pattern proceeding diagonally with respect to the needle courses is knitted by periodically retarding a wrap spindle that rotates in the same direction as the needle cylinder and feeds the body yarn to needles, feeds a wrap yarn to two adjacent needles, casts off the wrap yarn from the leading one of the two needles, and knits the body and wrap yarns by the other of the two needles. C.

Loom Heald Suspension. Harold Smith. B.P.627,819 of 23/7/1947: 16/8/1949. The heald shaft is suspended by a stirrup or band formed of half-round metal mounted on a sleeve or socket engaging a grooved or slotted plug carried by a turn-buckle supported by a wire cable from an overhead shaft or dobby mechanism, rotation of the plug through 90° disengaging the heald shafts for harnessing and unharnessing. C.

Circular Knitting Machine Needle Levelling Device. Hemphill Co. B.P. 627,840 of 14/3/1946: 17/8/1949 (Conv. 23/3/1945). A device for levelling needles in a circular knitting machine preparatory to opening the latches comprises means for raising the needles and co-operating means (A) for limiting the height to which the needles are raised and for aligning them radially in their cylinder slots. The mechanism (A) comprises a levelling element engaging the tops of the needle hooks and a cam surface that engages the hooks so as to prevent them from tilting outwardly. C.

Patterned Ribbed Fabric: Knitting. Hemphill Co. B.P.627,855 of 21/8/1946: 17/8/1949 (Conv. 13/9/1945). The claim is for a method of knitting a fabric (*e.g.* a stocking on a circular machine) having a broad true rib in which is included, according to a pattern, a raised pile. Wrap yarn is fed to a number of consecutive, selected needles, a second wrap yarn is fed to at least one of the same selected needles while the first wrap yarn is still on the latches, body yarn is fed to all the needles, and all the yarns are knitted simultaneously at the same point. C.

4—CHEMICAL AND FINISHING PROCESSES

(A)—Preparatory Processes

Surface-active Agents: Properties. B. J. Garceau. *Amer. Dyes. Rept.*, 1950, **39**, 87-90. A general account is given of the action of wetting agents, detergents, and emulsifiers. The most important types of anionic, cationic, and nonionic surface-active compounds are discussed. C—**4A.**

(B)—Boiling, Scouring, Degumming and Washing

Detergency Comparator. C. L. Nutting. *Amer. Dyes. Rep.*, 1950, **39**, No. 8, 260-261. The comparator consists essentially of a pair of dolly washers scaled down to laboratory size. It is constructed of stainless steel, has a thermostatically controlled electrically heated outer water bath, stepped pulleys for speed selection, baffles to prevent suds from cross-contaminating the detergent solutions under test, suds boxes which permit the expressed liquor to be returned to the main washing tank, *etc.* The procedure which is described has been developed to simulate the use and performance of detergents in the cloth finishing operations at an American mill. W—**4B.**

Scouring: Mechanical Action in —. G. L. Atkinson. *Text. Manufacturer*, 1950, **76**, 187-190. It is suggested that several cloth faults are due to mechanical action in scouring. The subject is discussed, and fitting a mouthpiece before the scouring machine rollers is advised as a means of reducing faults. W—**4B.**

Wool Piece Goods: Low Temperature Scouring with Nacconol NR. O. M. Morgan and J. E. Walter. *Dyestuffs*, 1950, **40**, No. 4, 67-75. The performance of Nacconol NR at 80° F. for the removal of emulsified mineral oil lubricants under laboratory scouring conditions is described. Results indicate that, to obtain a residual grease content of less than 1 per cent., a temperature slightly higher than 100° F. is necessary when a 0·5 per cent. Nacconol NR solution is used alone but that, in the presence of 0·5 per cent. sodium chloride a satisfactory scour may be achieved at 50° F. or even slightly lower. Also described are experiments designed to compare scouring at 80° F. and 120° F., using the detergent in the presence of different concentrations of sodium chloride, sodium bicarbonate, or soda ash. The best results were obtained with 0·2-0·5 per cent. Nacconol NR plus 0·5-1·0 per cent. sodium chloride. At 120° F., lower detergent and "builder" concentrations give better results than at 80° F. Exhaustion tests were carried out to determine the comparative periods of useful life that might be expected from the scouring solutions. **W—4B.**

(D)—Milling

Milling and Carbonising Processes: Faults Arising. K. E. Marsden. *Text. J. of Australia*, 1949, **24**, 832-834. The causes of several faults in milling and carbonising are mentioned, and suggestions are made regarding methods of preventing and eradicating these defects, which include mill-rigs, uneven felting properties (leading to uneven milling), "listing", chafes, oil and metal stains, inefficient washing out, and uneven extraction of acid in carbonising. **W—4D.**

Milling and Scouring: Ancient and Modern. C. O. Clark. *J. Soc. Dyers & Col.*, 1950, **66**, 187-190. The lecturer reviews milling and scouring mainly from an historical standpoint. The subjects discussed include the use of fuller's earth, substances which have superseded it, soap and synthetic detergents. **W—4D.**

(E)—Drying and Conditioning

Steam Dryers: Efficiency. ("Is Your Steam Dryer Eating Up Money?") T. G. Hicks. *Textile World*, 1950, **100**, No. 2, 149, 151. Some ways in which steam dryer efficiency can be improved are described. These consist chiefly in the removal of air and condensate from the cylinders. Suitable designs for air vents, drainage systems and steam supply lines are described and illustrated. **C—4E.**

(F)—Carbonising

Milling and Carbonising Processes: Faults Arising. K. E. Marsden. *See* Section 4D **W—4F.**

Soluble Wool-substance: Occurrence as a Result of the Sulphuric Acid Carbonising Process. J. Bauer. *Amer. Dyes. Rep.*, 1950, **39**, No. 4, 122-128. The series of experiments described includes (i) loss in scoured weight of wool when laboratory carbonised and neutralised, (ii) observations on neutralising solutions at 80° F. from laboratory carbonised wool, (iii) comparison of ammonia *vs.* soda ash neutralising at 80° F. of carbonised wool, (iv) protein tests by Millon's reagent on laboratory neutralising bath liquor, (v) loss in scoured weight of wool when laboratory carbonised and neutralised, showing variation with acid concentrations, drying time and temperature, (vi) nitrogen analyses. Tests were carried out on a number of commercially carbonised but unneutralised wool samples from various mills. Determinations of ash and carbon tetrachloride extractibles were made before and after neutralising. A substantial loss of wool in carbonising was observed. The possibility of utilising these methods for estimating the extent of damage caused by a given carbonising system is described. In discussing the mechanism involved, the lecturer suggested that acid hydrolysis of wool protein may be a factor resulting in loss of wool, and subsequent nitrogen analyses confirmed this theory. **W—4F.**

(G)—Bleaching

"Bantam" Miniature Bleaching Range. Wiesner-Rapp Co. Inc. *Textile Industries*, 1950, **114**, No. 2, 177; *Rayon and Synthetic Textiles*, 1950, **31**, No. 3, 97. A brief illustrated description is given of the "Bantam" continuous bleaching range comprising "J" box, washers, mangles and saturators as independent components that can be arranged to suit requirements. The capacity of the range is up to 900 lb. per hour, with adjustable speeds from 25 to 125 yards per minute. **C—4G.**

Bleach Liquors: Determination of Alkalinity. G. Bionda. *Chimica e Industria*, 1949, **31**, 316-318 (through *Brit. Abstr.*, 1950, C, 7). Experiments to determine the optimum conditions for assessing the alkalinity of bleach liquors containing 1·5-4 per cent of active chlorine (as hypochlorite) are based on the reaction: $2\ NaOCl + 2\ H_2C_2O_4 \rightarrow Na_2C_2O_4 + 2\ CO_2 + Cl_2 + 2\ H_2O$. C—**4G.**

(H)—Mercerising

Cotton Fibres: Factors Affecting Mercerisation. ("Fatores da mercerização.") Carlos Gorenstin. *Indústria Têxtil*, 1949, **18**, August, 66-72. The effects of (i) concentration of the caustic soda solution, (ii) tension, (iii) temperature, and (iv) impurities present in the caustic soda on the mercerisation of cotton are examined. The control of mercerisation is considered and optimum mercerisation conditions are indicated. C—**4H.**

Cotton: Mercerisation. ("Het merceriseren van Katoen.") Baldewijn Steverlynck. *Textielwezen*, 1949, **5**, No. 12, 25-29. The mercerisation of cotton is reviewed under the following headings: (i) Structural modifications during mercerisation; (ii) Mercerisation of yarns in hank form; (iii) Mercerisation of warps; (iv) Final results of mercerisation; (v) Choice of yarns for mercerisation; (vi) Preparation of yarns for mercerisation; and (vii) Mercerisation in the piece. C—**4H.**

(I)—Dyeing

Wool Fibre: Influence of the Cuticle in Dyeing. H. E. Millson and L. H. Turl. *Canadian Text. J.*, 1950, **67**, No. 6, 51-54. The authors refer to the fine structure of the wool fibre as revealed by both the optical and electron microscopes, and emphasise the overlapping scales, apparently wedge-shaped, decreasing in thickness towards the proximal end. The properties of the cuticle and cortex are different in some respects, and these affect the rate and penetration of dyestuffs. Dyes which penetrate the cuticle most readily produce dyeings of maximum uniformity under normal conditions. Other dyes appear to penetrate the cuticle only slightly below 180° F., but are able to enter the fibre through natural or artificial breaks in the outer sheath, and may then diffuse fairly easily through the cortex. The dependence of dye penetration upon physical factors, *e.g.* fibre distortion, natural degradations (sunlight and weathering), incision or mechanical damage to the cuticle have been examined. The effect on dye penetration of tying a knot before dyeing and also of incisions made by means of a razor blade were investigated. Scalewise dyeing effects indicated the important rôle of scale structure in controlling the penetration and diffusion of certain dyes into the fibre. The initial entry of the dye at the edge of the scales, and in some instances the rather sharply defined partial or complete colouration of the scale, has been explained by the existence of a surface layer which is capable of resisting the penetration of dye to a large extent. The importance of maintaining dyeing at the boil until the dyes have both penetrated and diffused is stressed. With chlorinated wool, the destruction of the protective surface layer occurred first at the distal ends of the wool scales. Similar results were obtained with wool bleached with hydrogen peroxide or stripped by means of hydrosulphite or zinc formaldehyde sulphoxylate. The authors suggest that this is due to either an inherent susceptibility to attack at the edge of the scales or to the influence of physical factors in the exposure of these regions to the reagent solution. W—**4I.**

Carpet and Rug Dyeing. B. Kramrisch. *The Cobbler*, 1949-50, **2**, 34-38. Suitable dyes are listed for various types of floor coverings, including those with wool, "Fibro" or mohair pile, and also sheepskins. W—**4I.**

Loose Stock Wool: Dyeing. S. Pegg and Son, Leicester. *Text. Mercury & Argus*, 1950, **122**, 643-644; *The Dyer*, 1950, **103**, 487. Two loose stock dyeing machines having capacities of 100/250 lb. and 200/600 lb. respectively are described. Important savings in dyeing time, in labour and in steam utilisation are claimed, and the loose wool dyed in the machine is stated to be entirely free from felting. W—**4I.**

Dyeing of Shoddy containing Vegetable Admixtures by Single Bath Processes. ("Das Färben von Reiszwolle mit vegetabilischer Beimischung im Einbadverfahren.") K. Wojatschek. *Melliand Textilber.*, 1950, **31**, 192-194. Some single bath processes for the dyeing of shoddy containing vegetable admix-

tures are discussed, together with some methods of after-treatment. The importance of satisfactory cleansing of the wool before dyeing is stressed on account of the frequent use of mineral oils. W—**41.**

Wool: Dyeing with Indigosols by a New Shortened Method. ("Das Färben von Wolle mit Indigosolen nach einem neuen Kurzfärbe-Verfahren.") Durand & Huguenin, A.-G. *Text. Rundschau*, 1950, **5**, 141-144. Dyeing is carried out at a temperature not exceeding 85° C. for 30 min. in the presence of an anion-active auxiliary agent, with the addition of 5-15 g. anhydrous sodium sulphate after the first 5 min., and two additions of 10-30 g. after the second and third periods of 5 min. The shade is developed in 15 min. with potassium bichromate-sulphuric acid at 85° C., followed by rinsing, neutralising and further rinsing. The method can be used for wool at any stage of manufacture. W—**41.**

Wool Dyeing: Studies; Effect of Metals on Tippy Dyeing. H. E. Millson. *Amer. Dyes. Rep.*, 1949, **38**, P378-P392. The effect of soluble metal salts of iron, copper, aluminium, cobalt and nickel present in the dyebath has been studied. The investigation included the metallisation of chromable dyes, the effect of after-chroming on metallised dyeings, and the sensitivity of dyes to metals. Microscopic examination has shown that the dye is metallised preferentially in the wool fibre tips and other damaged parts, subsequent chroming causing little change of shade in the tips. Radioautographs of dyeings made in the presence of traces of uranium and radioactive cobalt confirm the preferential absorption of metals by the tips. The effect of metal equipment is discussed, also the use of levelling agents and the effect of metals on shade and fastness properties. W **41.**

Dyeing Properties of Wool Dyes: Report of the Committee on —. *J. Soc. Dyers & Col.*, 1950, **66**, 213-221. The report is mainly concerned with the standardisation of existing methods for determining the dyeing and migrating properties of wool dyes. Appropriate standards of control have been specified, and a grey scale with which to assess the results of the migration test has been formulated. The recommended methods of test fall into two parts. The first part consists of five tests intended to determine the optimum conditions under which a given acid dye can be applied to wool so as to given an economic degree of exhaustion, and the second part consists of one test designed to give a measure of the ability of a dye to migrate in the dyebath from one part of the dyed material to another during dyeing. Full details concerning the preparation of solutions, apparatus, and procedure are included, and the organisations which co-operated in the work of the Committee are enumerated. W—**41.**

Wool Dyeing: Contribution to the Theory of Mordanting with Chromium and Aluminium. ("Contribution à la Théorie des Mordants de Chrome en général et de ceux à l'Alumine dans la Teinture de la Laine.") E. Justin-Mueller. *Teintex*, 1950, **15**, 57-71. The fastness to light, washing, felting, and sea water of wool dyed with several different mordants of chromium and aluminium are tabulated. Chemical theories of mordanting with bichromate in the presence of (*a*) sulphuric acid, (*b*) potassium hydrogen tartrate, or (*c*) formic acid are discussed. The effect of the inclusion of calcium acetate in the dyebath on many of the fastness properties of Alizarin Red W mordanted with aluminium are also tabulated. Chemical theories for mordanting with alum are proposed. W—**41.**

3-Azabenzanthrone Dyes. C. F. H. Allen, Jean V. Crawford, R. H. Sprague, Eleanor R. Webster and C. V. Wilson. *J. Amer. Chem. Soc.*, 1950, **72**, 585-588. A large number of variously substituted 3-azabenzanthrone dyes have been prepared and their absorptions are tabulated. No 1-arylamino derivatives have been reported previously; they are not particularly fast to light. C—**41.**

Meat Packing By-products: Utilisation in the Textile Industry. L. J. Armstrong. *Amer. Dyes. Rept.*, 1950, **39**, 85-86. An account is given of the utilisation in the textile industry of the following meat packing by-products: soaps, chemicals, glycerin, lard oil, hair and wool, glue, and blood albumin. C—**41.**

Viscose Rayon: Preparation for Dyeing. A. I. Avrunina and A. S. Frolov. *Tekstil. Prom.*, 1947, **7**, No. 3, 35-36 (through *Chem. Abstr.*, 1950, **44**, 844[a]). The swelling of viscose fibres by immersion in water, in soap solutions, in solutions of wetting agents, or in solutions of caustic soda is an important factor

affecting subsequent dyeing operations. Treatment at 60° C. for 40 minutes is recommended for optimum results when 2-3 grams/litre of wetting agent, 5 grams/litre of oleic soap, or 1 gram/litre of soda ash is used. C—41.

Automatic Tristimulus Integrator: Application in Textile Colour Specification. H. R. Davidson and I. H. Godlove. *Amer. Dyes. Rept.*, 1950, **39**, 78-84. The need for numerical colorimetry in textile mills is discussed and it is shown how a combined spectrophotometer and automatic tristimulus integrator can be used for this purpose. Applications include classification of colours, specification of tolerance, calculation of dye mixtures, evaluation of brightness, and evaluation of levelness and of fastness tests. Experimental data are given. C—41.

Automatic Processing Control Instruments. ("Quality and Cost Control through Instrumentation.") *Rayon and Synthetic Textiles*, 1950, **31**. No. 2, 91-93. The application of automatic instrument control to textile processes is discussed under recording and controlling stretch, automatic control of dyeing, automatic control in decating, continuous *pH* control, and the control of such processes as sizing and bleaching. C—41.

Padding Mangle. Mather and Platt Ltd. *Brit. Rayon and Silk J.*, 1950, **26**. March, 70; *Textile Recorder*, 1950, **67**. April, 82. A brief illustrated description is given of a new three-bowl padding mangle. Pressure on the bowls is exerted by pneumatic means and is measured at each end of the bowls by pressure gauges. Any pressure up to 9 tons can be applied. The top and bottom bowls are stainless steel-covered and are power driven, but the middle bowl is india-rubber-covered and is driven by contact with the other two. Roller bearings are used for the bowls. C—41.

Glycols: Use as Textile Lubricants and Conditioning Agents. J. S. Trevor. *Textile Recorder*, 1950, **67**. March, 86. General properties of polyalkylene glycols and some of their uses in the textile industry are briefly described. They find application in lubrication, as ingredients in finishing compounds, as wool oils, and as ingredients in dye pastes. C—41.

Protective Colloids: Application in Vat Dyeing. ("Versuch einer Bewertung von Schutzkolloiden in der Küpenfärberei.") Paul Wengraf. *Textil-Rundschau*, 1949, **4**. 328-332. The mode of action of protective colloids in vat dyeing is discussed with reference to some commercial products. A new method for measuring the protective power of the colloid is described: under standardised conditions, the amount of oxidising solution (sodium perborate or hydrogen peroxide) necessary to oxidise a given amount of Cibanone Yellow vat is measured, in the presence and absence of the protective colloid to be tested. C—41.

Fibro Carpet Yarns: Dyeing with Direct Cotton Dyes in Hard Water. M. V. Campbell. *J. Soc. Dyers & Cols.*, 1950, **66**. 120-132. The dyeing of Fibro carpet yarns with direct cotton dyes in hard water has been investigated. The range of direct cotton dyes available for use in hard water is considerably restricted by the following factors: (1) many direct dyes are insoluble in, or precipitated by, such water at the boil, and irrespective of the sodium chloride concentration give little or no dyeing; and (2) others are so sensitive to the large amounts of electrolytes present that in the absence of added sodium chloride they give a heavy "strike". On addition of small amounts of Calgon T to the dyebath dyes of type (1) are re-dissolved and the "strike" in dyes of type (2) is reduced. Coloured plates illustrate some dyeings made with well-known dyes. The application of the results in the practical dyeing of Fibro yarns in hard water is discussed. C—41.

Rayon Fabrics: Dyeing and Finishing. ("Quelques notes relatives au finissage des tissus de fibres artificielles.") J. Eustache. *Rayonne*, 1949, **5**. No. 11, 125, 127; 1950, **6**. No. 1, 100-102. A review is presented of the general technique of preparation and finishing of fabrics made of artificial fibres under the headings: preparation, desizing, bleaching, dyeing, and finishing. Particular reference is made to the choice of textile auxiliaries as aids in the various processes and to the selection of suitable dyes. C—41.

Viscose Rayon Yarns: Influence of Tension on Lustre and Dyeing. ("L'influence de la tension sur la brillance et la teinture d'un fil de rayonne viscose.") G. Quintelier and L. Hermanne. *Rayonne*, 1950, **6**. No. 1, 47-50. The results are presented of a series of experiments on the effect of tension on the lustre and on the depth of dyed shade of viscose rayon yarns. It is found that a "shiner"

is not caused directly by tension but by the position it takes in the fabric under the influence of tension: a yarn dyed under tension is lighter in shade than a yarn dyed without tension, irrespective of whether it is dried with or without tension. A brief interpretation of the results is given. C—**4I.**

Warps: Dyeing. G. S. Marr. *J. Soc. Dyers & Cols.*, 1950, **66**, 108-120. A lecture. An illustrated description is given of methods and machines used in warp dyeing. Drying and sizing of warp-dyed yarns are discussed. A brief account is given of the operative technical considerations in warp dyeing particular fabrics. C—**4I.**

Wool/Rayon Mixture Fabrics: Dyeing. ("Echte Halbwollfärbungen mit Schwefel-und Metachromfarbstoffen.") O. Hohmuth. *Kunstseide u. Zellwolle*, 1949, **27**, 247-250. A procedure is described for dyeing wool/rayon mixture fabrics, using sulphur dyes in conjunction with sodium bisulphite solution for dyeing the cellulosic component and metachrome dyes for the wool. Protectol W liquid is used to protect the wool fibres against damage. The optimum *pH* is about 8·5. Results are presented which show that the dyeing procedure did not result in any significant loss of strength. C—**4I.**

(J)—PRINTING

Printing Rollers: Dimensions, Care and Selection. D. C. McGiehan. *Textile World*, 1950, **100**, No. 2, 137, 139, 238, 240. General information is presented on copper printing rollers. Standard dimensions are tabulated. Some advice is given on the care and choice of rollers. C—**4J.**

Printing Colours for Cellulosic Textiles: Properties and Applications. ("Les colorants et leur emploi dans l'impression des fibres cellulosiques.") P. Hoton. *Rayonne*, 1948, **4**, No. 11, 68-69; No. 12, 75-83; 1949, **5**, No. 1, 29-37; No. 3, 73-79; No. 4, 45-51; No. 6, 83-90; No. 7, 45-51; No. 10, 54-55; No. 11, 65-67; No. 12, 73-76; 1950, **6**, No. 1, 51-53; No. 4, 67-71. The fundamental chemical structure of dyes used for the printing of cellulosic fibres is considered. A distinction is made between "ready-made" dyes, such as direct, basic, acid dyes, *etc.*, and dyes which form on the fibre during the dyeing or printing processes. After a discussion of the categories of dyes belonging to the former class, a number of auxiliary products are listed and described. Mordant dyes are discussed and the preparation of printing pastes is described. Vat dyes are considered in detail. The author finally discusses the application of indigosol dyes. C—**4J.**

Printing Paste Thickening Agents: Properties. ("Some Aspects of Printing Thickenings.") J. Zonnenberg. *J. Soc. Dyers & Cols.*, 1950, **66**, 132-140. A short summary is given of modern ideas on the structure and properties of starch, and its use as a thickening agent is discussed. An investigation has been made on: (1) the stability of various thickening agents to mechanical stirring; (2) the effect of mixing different thickening agents; and (3) the colour yield, levelling power, and character of thickening agents. Experimental data and photomicrographs are given of printing colours made with wheat, rice and maize starches, gum Arabic, Solvitose H_1, British gum, tragacanth, Solvitex B.G., and mixtures of starch and tragacanth. C—**4J.**

(K)—FINISHING

Low-grade Wool Cloths: "Handle". *Wool Record*, 1950, **77**, 579, 581, 583. Three main ways in which the "handle" of a fabric can be affected are discussed. These are (i) by the formation of "cover", (ii) by the working of the fabric, and (iii) by the production of a surface which is conducive to "slip". Crabbing, scouring, milling and finishing operations are mentioned in relation to the production of softer "handle" with particular reference to the fitting of mouthpieces to the dolly scourer. W—**4K.**

Wool Goods: Expediting Production. *Wool Record*, 1950, **77**, 1133, 1135. Innovations, improvements and modifications resulting from recent research in wool blending, the spinning of wool carpet yarns, wool-comb construction, dryers for slashers, drying of blankets, measurement of wrinkle resistance of fabrics, washing, and methproofing are described. W—**4K.**

Textile Processing: Quality and Speed. M. T. Fleming. *Canadian Text. J.*, 1950, **67**, No. 6, 62, 65. The lecturer advocates quality textile processing at

higher speeds. He compares and contrasts old and modern machinery, and describes recent advances in drying, shrinkage control, heat treating, dyeing and finishing. The subjects discussed include drying of textile fibres in the raw stock form where temperatures of 200° or even 300° F. may be used with low humidity for 1¼ minutes, raw stock carbonising which can be carried out at 230° F. without yellowing, cloth drying on the tenter where speeds of 60 yards per minute may be obtained and times reduced to less than one-fifth, setting of nylon fabrics, the Redman process for stabilising tubular knit goods against relaxation shrinkage, the continuous Vat Craft dye process, and over-feed tenter finishing range with resin pad which can be operated at 85 yards per minute.
W—**4K.**

Wired Glass Radiant Heat Panels: Application in Setting Nylon Fabrics. Gill Industries (New York). *Textile World*, 1950, **100**, No. 2, 172. A new method of heat-setting nylon fabrics employs radiant-heat panels of Fiberglas and wire in conjunction with a stenter. A controlled temperature range of 120° to 700° C. is attainable and it is claimed that no damage to fabrics or dyes is caused by its use.
C—**4K.**

(L)—Proofing

Mothproofing. R. Burgess. *J. Textile Institute*, 1950, **41**, P56-57. Methods for controlling insect pests when storing woollen materials include the importance of cleanliness, efficient wrapping and the use of fumigants, *e.g.* naphthalene and paradichlorobenzene. These are temporary expedients, and better protection is afforded by treating goods with chemical substances which are toxic to insects. Toxic substances may be stomach poisons, *e.g.* Mitin FF, Lanoc CN (Eulan CN), *etc.*, or contact poisons, *e.g.* DDT. Whilst the mothproofing effect of most of these substances resists solvent dry-cleaning, only Lanoc CN and Mitin FF confer resistance to all wet treatments. The author found that a method to make cloth indigestible to moth larvæ by modification of the disulphide linkage using sodium hydrosulphite and formaldehyde did not give satisfactory mothproofing. Details of the methods of application and effectiveness of Mitin FF and DDT are included.
W—**4L.**

Silicone Water Repellent for Nylon. F. L. Dennett. *Textile World*, 1950, **100**, No. 2, 155, 157. A new silicone durable water repellent treatment has been developed for fabrics made of nylon, cellulose acetate, Orlon or mixtures. The new water-repellent, De-Cetex 104, is a colourless, viscous high polymeric silicone. It is applied to fabrics in a dilute oil-in-water emulsion followed by a short heat cure.
C—**4L.**

(M)—Inspection and Packaging

Cloth Rolling, Inspecting and Measuring Machine. William Bradley and Co. *Textile Recorder*, 1950, **67**, March, 80-81; *Brit. Rayon & Silk J.*, 1950, **26**, March, 68-69. ("Preparation of Finished Fabrics for Making-up.") An illustrated description is given of the "Primm" C.R. model cloth inspection and trimming machine. This is a constant-speed reversible machine with a fully-automatic, self-regulating tensioning arrangement. A three-speed gear is incorporated giving, with normal settings, cloth speeds of 75, 100, and 125 feet per minute, respectively. Two models, one for cloths up to 50 in. width and the other up to 60 in. width, are available.
C—**4M.**

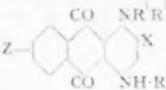
Patents

Textile Fabrics: "Shrunk" Finishing. Standfast Dyers and Printers Ltd. and William Kilby. B.P.626,336 of 31/10/1946: 13/7/1949. In a method of producing "shrunk" textile fabric the material in the wet or damp condition (*e.g.* directly after dyeing, printing or the like) is stretched weft-way to more than the width in the loom state while allowing free contraction warp-way, and the tension is then released and the fabric is allowed to dry.
C.

Dyed Nylon Fabrics: Discharge Printing. R. W. Hardacre and Imperial Chemical Industries Ltd. B.P.626,419 of 4/7/1947: 14/7/1949. Nylon fabrics that have been dyed with acid or sulphuric ester types of dyes (suitable members are named) are discharged to whites or other colours by printing with colourless or coloured organic compounds containing (1) carboxylic, (2) sulphonic, or (3) sulphuric ester groups, *e.g.* (1) oxalic, tartaric, citric and diglycollic acids, (2) Naphthalene Red JS, Tartrazine KS, Naphthalene Orange ROS, sodium naphthalene-β-sulphonate, and the Na salt of N-phenyl-N-γ-phenoxypropyl-

taurine, or (3) the sulphuric esters of phenyl β-hydroxyethyl ether and N-ethyl-N-β-hydroxyethylaniline. C.

Anthraquinone Acid Dyes. Allied Chemical & Dye Corporation. B.P.626,446 of 21/12/1944: 15/7/1949 (Conv. 1/1/1944). The claim is for the manufacture and use of a series of dyes of the general formula



where R^{I}, R^{II}, R^{III} and R^{IV} represent H or an alkyl, aralkyl, hydroxyalkyl, cycloalkyl, aryl, hydroaryl or heterocyclic radical, R^{III} represents the residue of biphenyl, and X and Z represent carboxyl or sulphonyl and either but not both may be H. They dye wool, silk, nylon and regenerated protein fibres bright blue to green shades. Many examples are given. C.

Calender. Julien Dungler. B.P.626,507 of 17/1/1947: 15/7/1949 (Conv. 20/2/1946). The claim is for a calender of lighter and simpler construction than the common multiple-bowl vertical or horizontal machines. A set of lower rollers is mounted on a fixed frame and the upper rollers are mounted on a frame that can be lifted out of action. Between them there is at least one central roller made of compressed fibre, mounted in stub axles on the upper frame and resting on the lower rollers. The drawing shows two rollers in the lower set, and an upper frame formed of lateral arms arc-shaped pivoted at one end about a spindle on the lower frame and adjustable from the other end by a lever device. The frame is shown with two rollers that bear on a central roller which rests on the two bottom rollers. The central roller is mounted in slideways formed in extension cheeks to the top frame. C.

Translucent Fabric for Glazing. British Celanese Ltd. B.P.626,513 of 21/4/1947: 15/7/1949 (Conv. 27/4/1946). An open-mesh woven or netted fabric made from vinyl or vinylidene polymer threads (especially monofils about 0·012 in. diameter) is filled with plasticized cellulose ester or ether to make a transparent or translucent material for glazing. C.

Nylon: Direct Dyeing with Vat Dyes. Courtaulds Ltd., John Boulton and E. E. Bowker. B.P.626,517 of 18/6/1947: 15/7/1949. Nylon (yarn) is dyed with unreduced vat dyes by applying the dye as a dispersion in an agent that acts as a swelling agent for nylon, *e.g.* a fatty alcohol-ethylene oxide condensate ("Dispersol A") dispersed in sulphuric acid. The application of Caledon colours is described in the examples. C.

Pigment Padding Dispersion containing Nylon Bonding Agent. E. I. du Pont de Nemours & Co., Mary O. Shows and P. L. Meunier. B.P.626,581 of 2/7/1947: 18/7/1949. A dispersion for padding or printing textiles with pigments contains as bonding agent a film-forming linear polyamide in which some of the amide N-atoms bear side chains, $-CH_2{\cdot}OR$, in which OR is the radical of an aliphatic or aromatic alcohol. These agents are made, for example, by condensing a nylon (6:6 or 6:10) with formaldehyde and an alcohol (methyl, benzyl, carboxymethyl, allyl, *etc.*) in an acid medium (*e.g.* formic acid). C.

Furfuryl/Urea Resins: Preparation. Quaker Oats Co. B.P.626,945 of 2/7/1946: 19/7/1949 (Conv. 4/4/1945). The 16 claims are for a series of heat-hardenable resins made by condensing furfuryl alcohol with dimethylolurea or dimethylolthiourea. C.

Hand Colour-decorated Fabrics: Production. Vera Picard (née Ossipoff). B.P.626,708 of 2/7/1946: 20/7/1949 (Conv. 12/7/1941 and 5/6/1942). The claim is for a method of decorating fabrics by hand so as to secure sharp outlines and the same appearance on both faces. The fabric is stretched over a frame and the pattern is sketched on it, if desired. The frame is then laid flat on a table (with absorbent ply-wood top) so that there is a space between the fabric and the table into which "colour carriers" may be inserted. These may be sheets of blotting paper or felt, each soaked in a particular fluid colour. With an appropriate hand tool (one for each colour) the artist works over the sketch and presses the fabric on to the colour carrier. C.

Striped Coating Applying Apparatus. L. N. Dexter. B.P.626,728 of 30/11/1946: 20/7/1949 (Conv. 30/11/1945). The invention relates to apparatus for continuously applying bands of colour (*e.g.* paint or lacquer) to fabrics (*e.g.* canvas). It comprises a trough divided by partitions into open-ended cells to conform with the desired stripes. The fabric runs under the trough and is pressed against the open cells, these being continuously supplied with colour. C.

Cellulose Acetate: Dyeing; Use of Swelling Agents. British Celanese Ltd. B.P.626,740 of 11/2/1947: 20/7/1949 (Conv. 12/2/1945). Addition to B.P. 583,349.[1] The material is impregnated with a solution of the dye (especially acid colours) in an aqueous alcohol (C_1 to C_3; at least 60 per cent. solution) and then with Na, K or NH_4 thiocyanate solution (15-25 per cent.). (See *J. Textile Institute*, 1947, **38**, A222.) C.

Colloidal Silica: Application as Non-slip and Strengthening Finishes to Yarns and Fabrics. Monsanto Chemical Co. B.P.620,847 of 16/7/1945: 22/7/1949 (Conv. 26/7/1944 and 14/4/1945). Yarns and fabrics (all types) are impregnated with a dialyzed silica sol of concentration sufficient to add 0·1 to 10 per cent. of silica, and dried. The following examples are given in detail: (1, 2, 8, 9, 13 and 14) non-slip, strengthening finishes to cotton sheeting, (3) and (4) finishing dyed wool fabric; (5) a silky finish on spun rayon fabric, (6, 10, 11) stiff, delustred effects on spun rayon fabric, (7) a snag-resistant finish on knitted rayon, and (12) non-slip nylon sutures. Lea strengths of 11s and 22s cotton yarns after treatment with 1, 2 and 3 per cent. sols are tabulated. There are 21 claims. C.

Flame-proof Yarn and Fabrics. Fine Spinners and Doublers Ltd., Mary Cunningham, Bleachers' Association Ltd. and Wilfred Kershaw. B.P.627,107 of 5/4/1947: 28/7/1949. Yarn (*e.g.* thoroughly absorbent cotton yarn) is saturated with a solution of a zinc salt, hydro-extracted, transferred to a borax solution to develop an insoluble zinc boro-compound within the yarn, hydro-extracted, washed, dried, impregnated with an emulsion of polyvinyl chloride plasticized with an organic phosphate (*e.g.* tricresyl phosphate), dried and baked so that the polyvinyl plastic forms a film. The fireproofed yarn may then be woven into a fabric. C.

"Dipsanil"-Starch-Glyoxal Impregnating Liquor: Application in Stiff, Water-repellent Finishes. J. R. F. Jackson, A. H. Lord and Imperial Chemical Industries Ltd. B.P.627,356 of 7/5/1947: 8/8/1949. A stiff, water-repellent finish is secured on textiles by impregnation with an emulsion of paraffin wax (*e.g.* Dipsanil V) and starch and prior, simultaneous or subsequent treatment with glyoxal. For example, cotton gabardine is impregnated at 60-80° C. with a liquor containing maize starch (50) made up to a paste (1,000), Dipsanil V (200) made up with water (to 1,000) and glyoxal (10 parts of a 30 per cent. solution), mangled, and dried at 110° C. C.

Textile Covers: Securing to Frames. Henry Simon Ltd. and J. S. Ball. B.P. 627,609 of 9/12/1946: 11/8/1949. The invention relates to means for stretching textile fabric uniformly over a frame, *e.g.* in sifting or screen printing machines. A resilient packing (*e.g.* sponge rubber strip) is secured in a groove around the frame and the fabric is clamped on to and into the packing by means of bars that are screwed or bolted to the frame. C.

Expanding-comb End Spacing Device. Dunlop Rubber Co. Ltd. and Charles Folliss. B.P.627,862 of 28/9/1946: 17/8/1949. The invention relates to an expanding comb based on the links of a "lazy-tongs" device for the spacing of ends in a sheet of cords preparatory to embedding in plastic, rubber or other sheeting. C.

Multi-coloured Selvedge Stamping Apparatus. Armando Reggiani (Reggiani Manifattura S.A.). B.P.627,868 of 23/10/1946: 17/8/1949 (Conv. 25/11/1941). Apparatus for selvedge stamping comprises means for supporting differently coloured inked ribbons, means for advancing them simultaneously between a stamp and the selvedge in a direction transverse to the movement of the selvedge when the stamp is inoperative, and a manual (lever) or pedal device for depressing the stamp. C.

Bottom Calender Roller Driving Mechanism. John Galloway & Co. Ltd. and James Butler. B.P.627,939 of 22/8/1947: 18/8/1949. The invention relates to means for giving a partial turn to the bottom roller of a calendering machine (especially for paper) when the power drive has been disengaged. It consists of

hand-operated reduction gearing operated from an auxiliary rotary pinion shaft adjacent to the ordinary power-driven gear wheel on the driving spindle for the bottom roller. C.

Bonded Fibre Fabric: Production. Johnson and Johnson (Gt. Britain) Ltd. B.P.626,960 of 31/7/1946: 25/7/1949 (Conv. 31/7/1945). A process for forming a fabric from card web consists in conveying one web in one lengthwise direction, conveying a second web lengthwise at right angles to the first so that the two come close together at crossing, severing the second web as it crosses the first and intermittently transferring the severed sheets to the first web. There are 21 claims and details are shown in 9 sheets of machine drawings. C.

Wool Textile Materials: Self-fulling and Self-scouring Lubricant for —. Nopco Chem. Co. B.P.634,588 of of 22/3/1950. A non-resinifying oil is mixed with the condensation product obtained by reacting an alkylolamine, preferably diethanolamine, and a fatty acylating substance with an acyl group of at least 8 carbon atoms. The composition acts as an anti-static oil during carding and spinning, and no addition of detergent, *i.e.* soap, is required during scouring and milling. It is preferably applied to the fibre as an aqueous emulsion. The cloth retain its soft handle. W.

Protein Textile Materials: Reduction of the Shrinkage and Felting Tendencies. M. Weisberg, A. S. Stevenson and L. Beer (to Alrose Chem. Co.). U.S.P. 2,484,599 of 11/10/1949. Protein textile materials are impregnated with an aqueous solution or suspension of urea-formaldehyde, or of melamine-formaldehyde, squeezed, dried at moderate temperature, then steamed at 212°-220° F. in an atmosphere of an excess of free volatile acid, preferably an organic acid. The results of tests for shrinkage, tensile strength and abrasion are as satisfactory when urea-formaldehyde resins are used as when the more expensive melamine-formaldhyde resins are used. A soft handle results. W.

Wool: Shrinkproofing with Diolefin-nitrile Copolymer. J. B. Rust (to Montclair Research Corporation). U.S.P.2,484,962 of 18/10/1949. Copolymers of a butadiene 1·3 derivative and an acrylonitrile or a methacrylonitrile are used to shrinkproof wool. Polymerisation is preferably carried out in an aqueous medium or emulsion in the presence of a catalyst. The copolymer is deposited on the wool fibres by adding an electrolyte to the treating bath. The wool may be treated at any stage of manufacture. W.

Carbonised Cloth: Continuous Neutralisation. ("Process and Apparatus for continuously neutralizing Dry Acid Cloth.") R. E. Derby. U.S.P.2,485,710 of 24/10/1949. Carbonised cloth is neutralised with ammonia gas by a continuous process which leaves the cloth in a dry state. The cloth passes over a series of rollers through a chamber; the neutralising gas is provided by passing dry ammonia through a pool of water at the base of the neutralising chamber, the supply of gas being controlled by means of an electric *pH* control so as to maintain a constant *pH* in the solution. The temperature of the solution is automatically maintained between 160° F. and well below boiling point so as to liberate ammonia gas and water vapour from the surface of the pool. The water vapour assists the neutralisation and does not wet the cloth. The excess neutralising gas is discharged from the neutralising chamber into a supplementary chamber where it comes into contact with the unneutralised dry cloth as it travels to the neutralising chamber. By correlating the water temperature and the flow of ammonia gas with the speed of travel of the cloth, complete neutralisation is effected continuously. W.

Detergents: Use of Urea-formaldehyde Condensates. L. H. Bock and J. L. Rainey (to Röhm & Haas Co.). U.S.P.2,486,459 of 1/11/1949. Water-soluble macromolecules are synthesized in which all the bonds between atoms are primary valence links and, hence, are strong and unaffected by concentration and temperature. These synthesized macromolecules contain balanced hydrophilic and hydrophobic groups so positioned that orientation occurs readily at an interface. The products are water-soluble, surface-active, polymeric detergents, comprising sulphonated condensates of urea, formaldehyde, and an aliphatic alcohol containing 6–18 carbon atoms. They may be used as detergents in hard or salt water, and have textile uses, *e.g.* in wool scouring. W.

Animal Fibres: Preparation for Dyeing. ("Präparat zum Färben von tierischen Fasern.") Ciba A.-G. Swiss Patent 241,199 of 1/7/1946. Very level

and often enhanced shades of animal fibres are obtained by the use of a stable preparation containing acid wool dyes, especially pre-metallised dyes, and a water soluble salt of an acid sulphuric acid ester of an acylated amine containing at least one oxyalkylether group and having at least 8 carbon atoms in the acyl residue. W.

Raw Wool: Process and Apparatus for Washing. Augusto Bozzalla. Italian Patent No. 434,117. April 21, 1948 (through *Chemical Abstracts*, 1950, **44**, 2763[f]). The wool is subjected to a process of progressive cold washings and rinsings on an intermittently or continuously moving permeable band consisting of a series of flexible rods or a net, while being sprayed with an alkaline liquid from showers arranged over the band. The rinsing with water is carried out by a passage on a similar conveyer. The alkaline liquor able to pass through the permeable band is collected and recirculated. W.

5—ANALYSIS, TESTING, GRADING AND DEFECTS

(A)—Fibres

Wool: Detection of Alkali Damage. R. Genet. *Text. Rundschau*, 1949, **4**, 351-364. An account is given of the chemical properties of wool, its behaviour towards alkaline solutions, and methods for detecting alkali damage. Washed and degreased wool was exposed at 80° C. to the action of 3 per cent. soda solution. Individual fibres were then tested for tensile strength and extension on the Schopper apparatus, and for sulphur content. The damage was greatest at the beginning of the reaction, strength, extension, and especially sulphur content degreasing with the logarithm of time. It is advisable to test the greatest possible stretched length of fibre. The test shows the differences between the tips and the shorn ends of the fibres, and gives a good criterion of their wearing properties. The Pauly test gave wide variations on the same fibre, and the results could not be quantitatively evaluated. W—**5A.**

Wool: A Study of the Peptides of Cystine in Partial Hydrolysates of Wool. R. Consden and A. H. Gordon. *Biochem. J.*, 1950, **46**, 8-20. A method is presented for the identification of lower peptides of cystine in partial hydrolysates of wool. Cystine peptides were oxidised to cysteic acid peptides and then separated by chromatography on anion-exchange resins. Further separation was achieved by ionophoresis and paper chromatography. Thirteen dipeptides were identified and a number of higher peptides of undetermined residue order. It is concluded that, in wool, most of the monoamino-monocarboxylic acids are combined both through their amino and carboxyl groups to residues of cystine. The results are compared with those of a similar investigation on the peptides of the dicarboxylic amino-acids in partial hydrolysates of wool. Evidence has been obtained for the formation of intermediate oxidation products of combined cystine by the action of hydrogen peroxide on wool. A number of dipeptides of *L*-cysteine and of *L*-cystic acid were synthesized. W—**5A.**

Wool Fibre Friction: Measurement. ("Understanding of Shrinking Sought in Wool Study.") *Textile World*, 1950, **100**, No. 5, 99, 292, 294, 296. Summary of a report submitted by Harris Research Laboratories, Washington, D.C. A laboratory instrument has been developed to secure accurate and reproducible measurements of surface friction on individual wool fibres. The device also measures the frictional properties of fibres while they are immersed in water. Results show no evidence of a relation between fibre diameter and coefficient of friction. Measurements of wet-fibre friction give higher values than measurements on the same fibres in the dry state. The effects of shrink-resistant chemical treatments on surface friction have also been investigated. Shrinkage decreases with increasing *pH* of wash liquor, but there is little difference in the range *pH* 5 to 10·8. It is suggested that the application of resins leads to shrink-resistance by bonding fibres to each other. W—**5A.**

Fibres: Electron Microscopy; Section Cutting Technique. S. B. Newman. *A.S.T.M. Bull.*, 1950, No. 163, 57-60. A new technique (which is described here and elsewhere[1]) has been applied to the preparation of thin sections of fibres for examination in the electron microscope. Electron micrographs are reproduced for fibres of deacetylated cellulose acetate, cuprammonium rayon and raw cotton. (*J. Textile Institute*, 1950, **41**, A69.) C—**5A.**

Fibres: Flow Properties. S. A. Rossmassler and Henry Eyring. *Textile Research J.*, 1949, **19**, 810-815. A mathematical treatment is developed of the sinusoidal rate of loading of fibres, based on visco-elastic behaviour. An experimental technique is described for obtaining data under such conditions and the theory is applied to data obtained with nylon 66 monofils. The results indicate that the significant values for the flow process are dependent on the frequency of vibration. C—**5A.**

Films and Fibres: Microscopy. F. F. Morehead. *A.S.T.M. Bull.*, 1950, No. 163, 54-57. Several micrographs are reproduced of fibres and films obtained with the light, the electron and the phase microscopes. They include micrographs of crêpes, viscose films and surface-saponified cellulose acetate. The usefulness of each of the three techniques is briefly discussed with particular reference to the investigation of the "skin" and "core" structure of viscose rayon. C—**5A.**

Fibre Pads: Water Evaporation through Layers of Fibres. ("Ein einfaches Verfahren zur Messung der Wasserverdunstung durch Schichten verschiedener Textilfasern.") R. Signer and M. Roth. *Makromol. Chemie*, 1949, **3**, 281-285. A simple procedure is described for measuring the transport of water through layers of textile fibres which are partly immersed in water and partly make contact with air of an average R.H. Results show that the "evaporation number" is low for protein fibres, higher for cotton, and highest for viscose rayon fibres. C—**5A.**

Cotton Fibres: Characteristics and Effects on Yarn Properties. ("Caractéristiques du coton et leur rapport avec certaines propriétés du fil.") D. de Meulemeester. *Bull. Inst. Textile France*, 1949, No. 14, 37-67. A lecture. Modern methods for measuring the length, breaking load and fineness of cotton fibres are reviewed and illustrated. Results of studies carried out in America and at Ghent University on the relationship between the properties of raw cotton and the quality of the yarn are considered. There are 29 references to the literature. C—**5A.**

Cotton Fibre: Differential Dyeing Test for Maturity; Application to Cotton Processing. American Association of Textile Chemists and Colorists, Southeastern Section. *Amer. Dyes. Rept.*, 1950, **39**, 74-77, 90. A differential dyeing test for fibre maturity[1] is described briefly and is applied (i) to determine the "tippiness" (incomplete cell wall development at the fibre ends) in cottons; (ii) to predict spinning quality of cotton; (iii) to distinguish cottons that do not dye well together; (iv) to diagnose processing difficulties; (v) to indicate effectiveness of blending judged by number of neps; (vi) to indicate the nature of processing waste; and (vii) to provide evidence of the relationship of fineness (Micronaire test) to maturity. A number of experimental data are presented in tables and graphs. ([1]Goldthwait *et al.*, *J. Textile Institute*, 1947, **38**, A513.) C—**5A.**

Viscose and Acetate Rayons: Longitudinal Mechanical Properties. ("Étude des propriétés mécaniques longitudinales des rayonnes viscose et acétate.") Canon J. Pinte and Jean Henno. *Bull. Inst. Textile France*, 1949, No. 14, 21-31, 31-36; *Rayonne*, 1950, **6**, No. 2, 53-55; No. 3, 55-59. *Mechanism of the Production of a "Pulling" Viscose Rayon Filament.* The tests used in this study are based on previous observations.[1] The "pulling" filament is produced by consecutive stretching, wet treatment, and drying, and the variations in length of a filament sample 100 mm. long during these treatments (applying stretching increasing progressively from 0 to 15 per cent.) are tabulated and graphed. The interpretation of the results is discussed and the conditions under which a "pulling" filament is formed in a fabric are considered. The defect originates with a stretched filament and is bound up with the possible variations of l_3-l_2 (length on wetting – length on stretching). *Study of the Bionomial l_3-l_1, i.e. the Aptitude of Rayons to Elongate in Water.* An apparatus is described and illustrated for studying the variation of l_3-l_1, as a function of relative humidity, stretching, and the duration of stretching. A rayon filament is unwound from a bobbin by the action of two cylinders of the same diameter, revolving at the same speed. A vertical shaft between the cylinders carries at its lower end a pulley which is connected by a flex to a template fixed rigidly to one end of a balance-beam; the filament passes from the first cylinder over the pulley to the second cylinder. The shaft dips into the wetting liquid in such a way that 45 cm. of filament are immersed. The deformation of the filament on wetting causes the balance-beam

to rotate and the magnitude of the phenomena is registered automatically in absolute values. (See *J. Textile Institute*, 1949, **40**, A159.) C—**5A.**

Viscose Fibres: Methoxyl Value and Textile Properties. Th. Kleinert and V. Mössmer. *Österr. Chem.-Ztg.*, 1948, **49**, 84-86 (through *Chem. Abstr.*, 1950, **44**, 8354). The methoxyl value of spun viscose fibres increases with chain length, as it does with natural cellulose fibres. The textile properties of viscose fibres prepared from wood pulp also improve slightly with increasing methoxyl value, as do those of cotton fibres. C—**5A.**

Silk in Lithium Thiocyanate: Optical Constants; Determination. R. Cerf. *C. r. Acad. Sci.*, 1948, **226**, 405-407 (through *Brit. Abstr.*, 1949, AI, 518.) Sadron's streaming birefringence method for determining the optical constants of dissolved macromolecules requires data for more than one solvent. A modified method, which is described, enables the constants to be determined from measurements of birefringence in a single solvent and of the difference between the refractive index for the solution and solvent. The method has been applied to suspensions of silk fibroin in aqueous LiCNS. The values of the refractive index for silk fibroin with reference to the axis of revolution and an equatorial axis were 1·39 and 1·40, respectively. The molecule is therefore only feebly anisotropic. C—**5A.**

Nylon Derivatives: Moisture Sorption. ("Water Sorption by Synthetic High Polymers.") Malcolm Dole and I. Lucille Faller. *J. Amer. Chem. Soc.*, 1950, **72**, 414-419. Moisture sorption data at 25° C. and at various relative humidities, are given for a number of N-iso-butylated 6-10 polyamides, polyvinylmethoxyacetals and certain polyesters and polyvinylpyrrolidone. The data are interpreted in the light of the Brunauer-Emmett-Teller and other sorption theories. Sorption by the polyesters is so small that it probably occurs only on end-groups. Sorption by polyvinylpyrrolidone is so great that probably every peptide bond serves as a sorption site. Sorption by the polyamides is small and greatly affected by the extent of disorder in the solid. The polyvinylmethoxyacetals absorb water to a much larger extent than expected at high vapour pressures of the water, suggesting that more sorption sites become available at higher relative humidities. C—**5A.**

Wood Cellulose Fibres: Morphological and Chemical Structure. ("Untersuchungen über den morphologischen und chemischen Aufbau von Holzcellulosefasern.") H. Haas. *Makromol. Chemie*, 1949, **3**, 117-131. An investigation of wood cellulose fibres has shown that, besides the morphological structure of the individual fibre layers, the differences in their chemical composition are mainly responsible for the behaviour of the fibres during conversions such as xanthation and acetylation. The study is reported under the following headings: (i) Generalities on the morphological structure of wood fibres; (ii) Morphological structure of the middle layer of the secondary cell wall; (iii) Chemical composition of the outer layer and its behaviour during acetylation and xanthation; (iv) Chemical composition of the inner layer and its behaviour during hydrolysis and acetylation; (v) Chemical composition of the middle layer of the secondary cell wall; and (vi) Experimental details. Thirteen photomicrographs are shown and there are 32 references to the literature. C—**5A.**

Radio-active Compounds: Use in the Textile Industry. ("Radioaktive Stoffe als wertvolle Hilfsmittel in der Textilindustrie.") H. Busath. *Kunstseide u. Zellwolle*, 1949, **27**, 236-237. The use of radio-active substances for measuring electro-static charges, thickness measurements, de-sizing control, dye-absorption control, and other control processes is briefly discussed. C—**5A.**

"Uster" Staple-Diagram Apparatus: Application to Cotton and Staple Fibre. ("Der Stapeldiagramm-Apparat 'Uster' von Zellweger AG für Baumwolle und Zellwolle.") E. Honegger. *Textil-Rundschau*, 1949, **4**, 385-396. The representation of staple diagrams by summation or frequency curves is considered. An illustrated description is given of the operation of the "Uster" staple-diagram apparatus, and results obtained on staple rayon and cotton are presented and discussed. Finally, advantages and disadvantages of the "Uster" procedure are pointed out. C—**5A.**

Alginate Fibres: Structure. ("Structure of Textile Fibres." XII.) E. E. Tallis. *J. Textile Inst.*, 1950, **41**, P52-P55. The molecular structure of alginic acid is compared with that of cellulose. Alginates of univalent metals are soluble in water and those of multivalent metals are insoluble (with a few exceptions),

The effect of cross linking (by hydrogen bonds) on the properties of alginates is indicated. Beryllium and chromium alginates are insoluble in dilute alkalis.
C—**5A.**

Cellulose: Submicroscopic Structure: Investigation by Nitrogen Sorption Measurements. C. M. Hunt, R. L. Blaine and J. W. Rowen. *J. Res. Natl. Bureau Standards*, 1949, **43**, 547-554. *Textile Res. J.*, 1950, **20**, 43-50. A sample of cotton linters, swollen with strong alkali and given a solvent-exchange treatment,[1] has been found to have a much greater surface area available to nitrogen than untreated material. Adsorption and desorption isotherms have been obtained showing strong hysteresis, and pore size distributions have been calculated. Alkali-treated samples, when conditioned with water vapour, show a progressive decrease in area. Cotton swollen with water only and given a solvent exchange treatment also shows an increased surface area. ([1]See Assaf *et al.*, *J. Textile Institute*, 1944, **35**, A266.)
C—**5A.**

Cotton and Rayon: Analytical Separation. Oskar Heim. *Anal. Chem.*, 1950, **22**, 360. A method is described for separating cotton from acetate or viscose rayon. The rayon solvent is a solution of sodium zincate and ammonium thiocyanate, NaOH 10, ZnO 4·5, NH_4CNS 10.
C—**5A.**

Dispersed Protein Fibres: Structure. ("The Structure of Textile Fibres." XI.) R. L. Wormell. *J. Textile Institute*, 1950, **40**, P16-P28. A description is presented of the preparation of new fibres from dispersed proteins. Three side-chain groups are important for the linking up of the protein "fragments", (1) the carboxyl group, (2) the amino group, and (3) the amide group. The ways in which these groups can be utilised are described. The influence of molecular size on the structure of the fibres made from proteins and the pattern of the fibre structure are discussed. The fine structure of these fibres as revealed by means of X-ray examination is dealt with and some X-ray photographs of casein fibres are presented.
C—**5A.**

Fibre Blends: Staining Test. ("Über eine leicht ausführbare technische Methode zur raschen Erkennung von Faserstoffklassen in Mischgespinsten und Mischgeweben.") Hans Draxl. *Textil-Rundschau*, 1949, **4**, 347-351. A simple technical dyeing procedure for distinguishing between different fibres in mixed yarns or fabrics is described. The dyes used are Brilliant Blue FFR extra for identifying silk, Eosine extra for wool and wool-like artificial fibres, Chloramine Yellow for cotton and viscose rayon, Chloramine Orange G for cuprammonium rayon and Lanusa, and Cellitone Pink for acetate rayon. Details of the method are given and the dyeings obtained with various fibres are listed.
C—**5A.**

Jute: Bulk Torsional Rigidity and Spinning Quality. B. K. Chakrabarti. *Indian Textile J.*, 1950, **60**, 319-331. The bulk torsional rigidity of jute has been determined by a dynamical method which works on the principle of a rotating disc torsion pendulum. An illustrated description is given of the apparatus and experimental procedure. Results show that a sample of jute with a high bulk torsional rigidity tends to produce a yarn with a lower strength and a high irregularity. Some preliminary investigations of the rigidity of single-fibre strands of jute are also described.
C—**5A.**

Rayon Filaments: Longitudinal Abrasion; Theoretical Considerations and Measurements. V. E. Gonsalves. *Textile Research J.*, 1950, **20**, 28-42. A simple derivation is given of a formula for the longitudinal abrasion of a rayon filament, indicating the relation between time of abrasion to break and the load on the thread, but the formula does not correspond with experimental results. The abrasion process is therefore examined more exactly and another formula is obtained which is in better agreement with experiment. Some measurements made on threads spun with increasing stretch are discussed and it is shown that their apparent increasing resistance to abrasion with increasing stretch disappears when the strength is measured after abrading the thread for one minute, this strength being designated the "one minute strength".
C—**5A.**

Silk Fibroin: Fine Structure. ("Über den Feinbau des Seidenfibroins.") R. Hegetschweiler. *Makromol. Chemie*, 1949, **4**, 156-183. An investigation of the polarisation-optical behaviour of silk fibroin has shown that the double refraction is not affected by changing the medium of imbibition. In contrast to the statement of Ohara[1] no rod double refraction could be found. Therefore, silk fibroin does not represent a composite body in the sense of Wiener's (1912) theory. The intrinsic double refraction of silk fibroin for sodium light is

1·5960 – 1·5454 = 0·0506, and for white light (550 mμ) 0·0514. Electron microscope studies show the absence of interfibrillar spaces which are necessary for a Wiener body. The fibroin is not individualised into microfibrils of constant diameter (as in cellulose fibres) but breaks into strands of different size when treated in a "Blendor". There are 30 references to the literature. (*J. Textile Institute*, 1933, **24**, A434.) C—**5A.**

Textile Fibres: Influence of Molecular Structure on Swelling. (1) N. J. Abbott; (2) L. Rose. *J. Textile Institute*, 1950, **41**, T53-T54; T54-T55. (1) Some results have been obtained on the swelling in water of drawn and undrawn nylon which are in disagreement with the current views on the subject. In order to be able to predict the ratio of the lateral to the longitudinal swelling it is suggested that knowledge of the amorphous regions of the fibre (where water is absorbed) must be increased. Some observations indicate that there must be some configurations other than the crystalline which effectively block the entry of water molecules. It is shown that any treatment of the fibre, physical or chemical, which affects the orientation of the crystallite will also affect the ratio of longitudinal to lateral swelling. (2) Some comments are made on the above contribution. Several methods of attack may be combined to determine the orientation of amorphous regions. X-rays, birefringence measurement, swelling measurements, and measurement of mechanical properties (such as Young's Modulus) can all be employed. The swelling method offers the greatest chance of obtaining useful results. C—**5A.**

Textile Fibres: Properties and Economics. ("The Battle of Fibres.") P. W. Webb. *Rayon & Synthetic Textiles*, 1950, **31**, No. 2, 39-41; No. 3, 62-63. The consumption of textile materials according to certain price groups is examined and this is related to the physical properties of the fibres. Yarn breaking strength/cost relationships are discussed and illustrated diagrammatically for several yarns and counts. Consumer preferences for feel and appearance and light weight are considered, and an interpretation of thermal qualities is put forward. Blending for best qualities is suggested. C—**5A.**

Textile Fibres and Resins containing Tertiary Amines: Chromatic Identification. M. Palumbo. *Ann. Chim. appl.*, 1948, **38**, 519-524 (through *Brit. Abstr.*, 1950, C, 13). Fibres, or synthetic resin samples, heated for 1-2 minutes to boiling point in acetic anhydride containing 0·5 per cent. of *cis*-aconitic anhydride (or aconitic acid, in which case the solution must be boiled until pale green in colour, before use)—reagent for tertiary amines—develop the following colours, observed after drying on filter paper and immersion in oil on a microscope slide: wool, intense red; protein-base fibres (Lanital) or products from formaldehyde and casein, melamine or aniline, claret; silk, light red; nylon or formaldehyde-amide resins, grey; artificial cellulose fibres containing proteins, intense red coloration of protein constituents only. Of the three products obtained by centrifuging wool which has been slowly attacked by hydrolytic agents internal fusiform cells and lanain give an intense red colour, and thus contain tertiary amines, but the external scale is uncoloured. C—**5A.**

(B)—YARNS

Rope Elongation. D. Himmelfarb. *Fibres, Fabrics & Cordage*, 1950, **17**, No. 2, 48-50. The terms elongation and elasticity are discussed. Fibre ropes do not recover rapidly or completely when applied working loads are released, and are therefore not truly elastic. A graph illustrates the relationship between applied load and elongation, for a new manila rope and a mild steel wire rope. Factors affecting the property of elongation, and variation in behaviour of different ropes are discussed. Strand twist and rope twist are mentioned as being most important in this connection. Several charts illustrate the article, and two tables are given. L—**5B.**

Cotton Yarn: Effect of Fibre Properties on Quality. ("Relation of Fibers and Yarn Influenced by Several Factors.") R. W. Webb and H. B. Richardson. *Textile World*, 1950, **100**, No. 2, 128-129, 226, 228. The properties of cotton fibres and yarns have been studied and fibre property/yarn property relationship coefficients have been obtained. Yarn strength (22s yarn) is used as the standard yarn property and six fibre properties are taken, *viz.* (i) upper half mean length, (ii) uniformity ratio, (iii) fineness, (iv) maturity, (v) strength, and (vi) grade. Relationships are classified according to (*a*) Crop year; (*b*) Variety; (*c*) Staple length; and (*d*) Fiber-length combinations. Under these heads data which have been collected over a number of years are presented. C—**5B.**

Cotton Yarn: Shrinkage in Swelling Agents. M. G. Karnik and S. C. Devadatta. *J. Univ. Bombay*, 1949, **17A**, Pt. 5, 49-60 (through *Chem. Abstr.*, 1950, **44**, 337°). Shrinkage of cotton yarn has been studied in zinc chloride, calcium thiocyanate, sulphuric acid, and orthophosphoric acid at various concentrations and temperatures. In $ZnCl_2$ the maximum shrinkage and time to reach the maximum increase with concentration; maximum shrinkage is little affected by temperature, but time is reduced by increased temperature. The same is true for specimens in $Ca(CNS)_2$, except that maximum shrinkage is low in all cases. In H_2SO_4 up to 50 per cent. concentration, shrinkage increases with temperature; above this concentration there is less shrinkage. In H_3PO_4 the shrinkage increases up to 50° C., and decreases above this temperature, for all concentrations. It is postulated that increased chemical degradation is responsible for these definite maxima at the less severe conditions experienced with H_2SO_4 and H_3PO_4. C—**5B.**

Filaments and Yarns: Mounting for Strength Testing. ("New Methods for Holding Multi- and Single-filament Tensile Specimens.") Richard La Torre and Waller George. *Textile Research J.*, 1949, **19**, 830-832. New methods of gripping the yarn during tensile strength measurements have been developed. By their use the usual wide scatter of results is narrowed. Single filaments are cemented into rod-shaped plastic blocks, *e.g.* polystyrene. Multi-filament yarns are held inside a hollow metal tube by means of a suitable thermoplastic filler, such as cellulose caprate. C—**5B.**

Portable Photo-electric Yarn Diameter Meter. Standard Electronic Research Corporation. *Textile World*, 1950, **100**, No. 2, 163. A brief illustrated description is given of an instrument for the measurement of yarn evenness during spinning. Known as the Yarn Checker, the instrument uses photo-electric principles to measure yarn thickness. As the measuring medium is non-contact, no interference or damage is suffered by the yarn. C—**5B.**

Continuous-Filament Yarns: Stress Analysis. ("Mechanics of Elastic Performance of Textile Materials. III.") M. M. Platt. *Textile Research J.*, 1950, **20**, 1-15. A theoretical discussion based on yarn geometry. Stress-analysis methods for textile materials are illustrated by a study of the forces produced when a continuous-filament yarn is stressed in tension. It is shown that the effects of yarn twist and yarn size on the tensile properties of singles continuous-filament yarns depend upon the stress distribution. Mathematical formulæ are derived to express variations in tensile characteristics, both for one-time loading to rupture and repeated stress, as a function of yarn structure. The influence of inherent fibre properties is described and illustrated by experimental data obtained for viscose rayon, acetate rayon, and nylon of various singles construction. C—**5B.**

Cotton Yarn: Structure; (I) Macro Yarn Structure. J. Gregory. *J. Textile Institute*, 1950, **41**, T1-T13. The macro features of cotton yarns that contribute to strength/weight/twist relationships have been investigated. The single-thread test and its interpretation are discussed and the limitations imposed by yarn irregularity are considered. A series of tests has been carried out on grandrelle yarns spun from Texas cotton in a range of values of strength, weight and twist. These tests consisted of (i) strength measurement, carried out on 3-inch specimens containing well-defined thin places at which breaks were likely to occur; and (ii) twist/weight calibration, in which the twist was measured on successive half-inch lengths of yarn which were then weighed. The experimental methods are briefly described and data are tabulated. In the light of the results twist/weight relationships in singles yarn, and the strength of twisted yarn elements (yarn element is that portion of yarn in which break occurs) are discussed. The latter results are analysed as follows: strength *v.* weight at constant twist, strength *v.* twist of constant weight, and strength *v.* weight with varying twist. The work has established, in principle, a method of approach for measuring the strength of a yarn in a way that is free from the effects of specimen length. C—**5B.**

Cotton Yarn: Structure; (II) Preparation and Strength Testing of Artificial Yarn Elements. J. Gregory. *J. Textile Institute*, 1950, **41**, T14-T29. The information obtained in Part I (above) has led to the development of a new testing machine for gripping a length of roving at two points outside the length of the longest fibres,

separating the grips to produce a thin place at the middle, inserting twist (the specimen being allowed to contract and being moderately loaded to prevent snarling) and then registering the breaking load by pulling the grips apart. In order to relate the measured breaking load to the weight and twist of the thin place produced at the middle, separate calibration tests are made to define these quantities in terms of the weight and twist of the whole specimen between the grips. A fully illustrated, detailed description of the apparatus and its method of use is given. The calculation of fibre distribution in stretched roving is briefly explained. C—**5B.**

Cotton Yarn: Structure; (III) Strength of Artificial Yarn Elements in Relation to Bulk and Twist. J. Gregory. *J. Textile Institute*, 1950, **41**, T30-T52. An analysis is presented of the data provided by tests with the artificial yarn element tester (described in Part II above) on a limited number of cottons covering the range normally encountered in spinning. The cottons used were carded Bengals and Texas and combed Giza 12 and St. Vincent Sea Island. The mixing of the cotton and the preparation of rovings are described and other experimental details deal with weight calibration and variability, twist calibration and variability, strength measurement and variability, and diameter measurement. The results are discussed under the following headings; (i) Breakage length *v.* twist at constant weight of element; (ii) Influence of count of yarn element on breaking length; (iii) Relation between count and twist for maximum strength; (iv) Twist angle corresponding to maximum strength; (v) Comparison between carded and combed quality; and (vi) Density. No attempt is made to interpret the strength of the twisted yarn element in terms of properties other than those of its macrostructural features of weight per unit length and twist. C—**5B.**

Sized Yarns: Resistance to Abrasion. ("Mésure de la résistance des fils au frottement sur une arête métallique.") V. Hildebrand and L. Parriaud. *Bull. Inst. Textile France*, 1949, No. 15, 69-74. An apparatus is described and illustrated for measuring the resistance to wear of sized yarns; a longitudinal and transversal to-and-fro movement is imparted to a steel blade in contact with a horizontal sheet of sized yarns held at the same tension. The number of movements necessary to break the ten first threads is recorded. C—**5B.**

Yarns: Shrinkage During Washing; Determination. ("Bestimmung des Eingehens beim Waschen.") Swiss Society for Testing Technical Materials. *Textil-Rundschau*, 1949, **4**, 462-463. Particulars are given of the Swiss standard method SVMT25, C 3004 for determining the shrinkage of yarns under the action of moisture, heat and friction, or chemicals. C—**5B.**

(C)—FABRICS

Dyed and Printed Goods: Determination of Fastness to Decatising. ("Bestimmung der Dekaturechtheit von Färbungen und Drucken.") SVMT 25 A 2579. Swiss Assn. for Testing Technical Materials. *Text. Rundschau*, 1950, **5**, 100. The method is applicable to wool at all stages of processing and also to mixtures of wool and other fibres. Small patterns of cloth or bundles of fibres are placed on a perforated surface between layers of dry raised cotton molleton, and decatised for 15 minutes in an open or closed system. W—**5C.**

Wool Textiles: Faults. F. F. Elsworth. *The Cobbler*, 1949-50, **2**, 20-24. The uses of microscopical examination, of chemical analysis and of various types of staining and dyeing tests in examining faults in wool materials are described. Faults caused by metal stains, by differences in dyeing affinity, by mineral oil and by unsatisfactory scouring are also discussed. W—**5C.**

Tricot Fabrics: Analysis. ("Proper Technique Speeds Analysis of Tricot Fabrics.") R. F. Eshleman. *Textile World*, 1950, **100**, No. 2, 122-124, 248, 250. An illustrated description is given of the analysis of the construction of tricot fabrics, with a list of the equipment required. C—**5C.**

Wash Fastness Determination Apparatus. M. Vlasova. *Tekstil. Prom.*, 1947, 7, No. 3, 41 (through *Chem. Abstr.*, 1950, **44**, 843°). A washing-machine type of apparatus is proposed for the determination of the fastness of coloured textiles. This is an improvement on the standard Russian test method for fastness, which does not take into account the effect of mechanical action. C—**5C.**

Clothing: Prescription for World-wide Climatic Conditions. D. H. K. Lee and H. Lemons. *Geographical Rev.*, 1949, **39**, 181-213 (through *Bull. Hyg.*, 1949, **24**, 985-986). The significance of man's thermal environment is discussed

from physical, mechanical, psychological and biological aspects. World climatic maps have been prepared and seven clothing zones defined, and these are discussed in respect of civilian and army clothing requirements. The thermal basis of clothing design is discussed and a general expression for the effect of clothing on the heat loss from the surface of the human body is derived from Burton's equations. C—**5C.**

Cotton and Linen Fabrics: Physico-chemical Investigation. ("Physikalisch-chemische Messungen au Baumwoll-und Leinengeweben.") K. Huber. *Textil-Rundschau*, 1949, **4**, 310-328, 431-442. A detailed discussion is presented of physico-chemical measurements on cotton and linen fabrics under three main headings: (i) Viscosity measurements on chemically modified cotton and flax fibres; (ii) Mechanical tests on cotton and linen fabrics; and (iii) Combination of viscometric and breaking-strength measurements on cotton and linen fabrics. It is shown that viscometric measurements of native cellulose in cuprammonium solution, using graduated-stem viscosimeters, are not sufficiently accurate. The concept of "fluidity number" (*Flüssigkeitszahl*) is introduced, which is the simple numerical value of fluidity expressed in "rhes" of a 0·5 per cent. native cellulose solution in cuprammonium of known composition at 20° C. This value can be used as a basis for the classification of cotton and linen goods. After considering the determination of the average degree of polymerisation and mechanical tests on cotton and linen fabrics, the author discusses the possibility of establishing a relationship between "fluidity number" and mechanical damage. Although no general applicable relationship exists, it is shown that the relationship may give useful information in special cases, *e.g.* for distinguishing between mechanical and chemical damage in machine laundering. It is pointed out that such determinations should be based on the wet, not the dry, breaking strength of the fabric. The paper is illustrated by graphs and tables and there are 52 references to the literature. C—**5C.**

Rayon Fabrics: Warps Streaks; Causes and Prevention. ("Le veinage en chaîne.") G. Bovy. *Rayonne*, 1950, **6**, No. 1, 75-77, 79. Warp streaks occur frequently in viscose rayon fabrics, and circumstances in which they may be caused in spinning, sizing, winding, warping, weaving and dyeing are listed. Hints are given on how to detect the factor which has given rise to the defect. C—**5C.**

Silk and Rayon Fabrics: Calculation of Weight. ("Praktische Schnellberechnungsmethoden zur Ermittlung des Stück-und qm-Gewichtes der Gewebe aus Natur-und Kunstseide.") Ernst Möller. *Kunstseide u. Zellwolle*, 1949, **27**, 253-256. Instructions and formulæ are given for the rapid practical and theoretical determination of the piece and square-metre weights of fabrics and are illustrated by worked examples. C—**5C.**

Viscose Fabric Printed with White Discharge Paste: Degradation. ("La dégradation de la rayonne viscose imprimée en rongeant blanc.") Canon J. Pinte, (Mrs.) —. Pierret, and —. Rochas. *Bull. Inst. Textile France*, 1949, No. 15, 43-62. Those parts of a viscose fabric which have been printed with white discharge paste often lose all their strength. The nature, cause, and mechanism of this degradation have been investigated. Having successively eliminated various factors involved in the phenomenon the authors conclude that the reaction is oxidation by atmospheric oxygen catalysed by the formaldehyde sulphoxylate of the discharge paste. The activity of the catalyst is of short duration and immediately precedes its decomposition. The catalytic activity is probably due to the formation of unstable peroxides. The oxycellulose formed is mainly of the periodate type. Deterioration can be avoided by eliminating air during steaming, *i.e.* by working in an atmosphere of nitrogen. In an appendix, results are presented of a parallel series of experiments on discharge-printed cotton fabrics, which show that degradation is produced under the same conditions as for rayon but that it affects the mechanical properties of cotton to a less extent than those of rayon. C—**5C.**

(D)—OTHER MATERIALS

Dyeings: Fastness; Standardisation of Systems of Classification. ("Über die Bestimmung der Farbechtheiten.") Heinrich Ris. *Textil-Rundschau*, 1949, **4**, 396-400. A report of a lecture already noted in a French version (see *J. Textile Institute*, 1950, **41**, A254.) C—**5D.**

Plastics: Determination of Ignition Characteristics. N. P. Setchkin. *J. Res. Natl. Bureau Standards*, 1949, **43**, 591-608. A method for the determination of the ignition temperatures of plastics is described. It is suitable for the determination of flash-, as well as self- or autogenous-ignition temperatures. The specimen is heated in an electrical furnace through which air at a constant known temperature is passed. The apparatus and experimental procedure are described and the behaviour of a number of plastics (including cellulose derivatives and fabric laminates) when subject to the test is discussed. The appearance of the specimens after undergoing the test are illustrated by photographs. C—**5D.**

PATENTS

Sliver or Roving Stapling Test Apparatus. Paul Litty. B.P.626,716 of 22/8/1946: 20/7/1949 (Conv. 3/3/1939). The claim is for an apparatus for determining the "useful" staple length of fibres in a sliver, roving or the like. It cuts a tuft of pre-determined length (*A*), greater than twice the length of the longest fibres present, clamps the tuft over a narrow middle region, and combs out the tuft on both sides of the clamp. An uncombed tuft is weighed (*B*) and also the combed tuft (*C*). The "useful" staple length (*L*) is given by $L=A.C/B$. The "useful" length is not the same as the mean staple length but approaches this as the fibres in the sliver or roving become more and more parallel. The apparatus therefore provides a means of assessing the progress of a series of spinning processes as judged by parallelism and regularity of the product. C.

7—LAUNDERING AND DRY-CLEANING

Cotton and Linen Fabrics: Effects of Laundering. ("Inverkan av bykningstemperaturen, bykningstiden och tvättmedelskoncentrationen vid maskin-tvättning.") Sigurd Köhler. *Reprint from Tvätt-Tidningen*, 1949, No. 9, pp. 12. Investigations have been carried out on the influence of the quantity of alkali, the maximum temperature and the time during which the maximum temperature is maintained, on the strength, loss of weight, ash content and whiteness of cotton and linen fabrics after 50 and 100 washings. Strips (cut in warp and weft directions) of bleached cotton and linen were used and washed in one series of experiments with high-titre soaps and in another series with low-titre soaps. In each series different quantities of sodium hydroxide or sodium carbonate were used and the maximum temperature and the time of washing at that temperature were also varied. Data are presented graphically and in tables. The results are discussed and their application to the practical laundering of cotton and linen goods is indicated. A fairly extensive English summary is given. C—**7.**

8—BUILDING AND ENGINEERING

(A)—CONSTRUCTION AND MAINTENANCE OF BUILDINGS AND PLANT

Flax Mill Modernisation. S. A. G. Caldwell. *Text. Manuf.*, 1950, **76**, No. 903 (March), 139-141. The layout of mill buildings should be planned to ensure a continuous flow from the entry of the raw material to the place of despatch. A flow chart illustrates this for a flax spinning mill. It is pointed out that a rest period between processes improved the quality of the fibre, and should be taken into consideration. When modernising existing buildings the opinion of an experienced consulting engineer is most valuable. New buildings should be planned to accommodate modern units in the right balance, and space should be provided for free movement of operatives, and for possible new machines at a future date. Many flax spinning mills have been operating for well over fifty years, and additional buildings have been erected with no consideration for economy in handling material or the disposition of operatives. The minimum degree of segregation should be allowed as internal walls, passages, different floor levels, *etc.*, can add greatly to cost of power transmission, heating, lighting, *etc.* Various types of buildings are discussed. Preference for the single storey type is increasing. A U-shaped building, whether single or multiple storied has many advantages. Diagrams illustrate the layout of the two different types in which a forward flow of material is ensured. As regards modernisation of the power plant, the merits of produced or purchased electricity are described. In considering new equipment the anticipated performance of new machines has to be considered. This and other factors are discussed briefly. Labour costs in the flax spinning mill are also mentioned. L—**8A.**

Plastics Textile Machinery Parts. ("Plastics in the Service of Man.") *Plastics*, 1950, **15**, 70-73. The use of plastics in the textile industry is illustrated by a series of photographs of bobbins, pirns, rayon spinning pots, yarn guides, gear wheels, shuttles, picking sticks, and tape-tensioning pulleys. C—**8A.**

(D)—Power Transmission

Electric Drives for Looms: Selection. R. J. Demartini and A. F. Lukens. *Textile Research J.*, 1950, **20**, 53-64. Mainly theoretical. A method is outlined for calculating the requirements of a loom drive from a knowledge of constants of the system and without extensive testing. When electrical testing is performed the pulsating character of the load must be taken into account in the selection of instruments and in the interpretation of data. The value of inertia in the successful drive is also discussed. C—**8D.**

(F)—Lighting

Fluorescent Lamp Installations: Operation and Maintenance. W. A. R. Stoyle and G. D. Jones-Thomas. *Trans. Illum. Engng. Soc.*, 1950, **15**, 1-37. Fluorescent lamp and circuit characteristics are dealt with from a practical point of view. A detailed description of circuit components is also given, together with recommended testing methods and advice as to how troubles can be detected, identified and remedied. C—**8F.**

Fluorescent Lighting Systems. ("L'éclairage par lampes fluorescentes.") E. Broes. *Rayonne*, 1950, **6**, No. 1, 103-108. In conclusion of previous articles,[1] the author discusses the power factor of a fluorescent lighting installation, and the behaviour of fluorescent lamps in service (average life, effect of temperature on functioning, *etc.*). ([1]*J. Textile Institute*, 1950, **41**, A143.) C—**8F.**

(G)—Heating, Ventilation and Humidification

Textile Mill Refrigeration Plant. ("Refrigeration Can Pay for Itself.") P. L. Davidson and J. De B. Shepard. *Textile World*, 1950, **100**, No. 2, 159, 161. The lowering of temperatures in textile mills to a comfortable working level by means of a central refrigeration system is discussed briefly. Evidence shows that besides increasing the workers' comfort, refrigeration raises weaving efficiency and reduces stoppages and seconds. C—**8G.**

Textile Mill Temperature Measuring Systems: Selection. C. W. Bowden. *Textile Research J.*, 1949, **19**, 826-829. Two types of temperature measuring systems for use in textile mills are briefly described and illustrated, *viz.* pressure-type thermometers and electrical temperature measuring systems. Of the first type vapour-, gas- and liquid-filled systems are dealt with. Resistance thermometers, thermocouple pyrometers and the Electronik Potentiometer are described under the electrical devices. Factors which may influence the choice of a particular system are indicated. C—**8G.**

(H)—Water Purification

Textile Industry Water Supplies: Treatment. ("Das Wasser in der Textilindustrie und in Dampfkesselbetrieb.") Heinrich Stenger. *Kunstseide u. Zellwolle*, 1949, **27**, 231-236. Water treatment methods used in the textile industry are described and discussed under the headings: (i) Pretreatment; (ii) Softening; (iii) Elimination of iron, manganese, and acids; and (iv) Softening of water for feeding steam boilers. C—**8H.**

(I)—Waste Disposal

Wool-finishing Mill: Waste-treatment. W. B. Goode. *Textile World*, 1950, **100**, No. 1, 100-102. The treatment of waste from an American wool-finishing mill dealing with dry-cleaning, carbonising, washing, fulling, continuous scouring, dyeing, and other finishing operations is described. Details are given of the layout, chemicals used, and method of operating the waste-treatment plant. W—**8I.**

9—SCIENCE

Polymers: Crystallinity; Estimation by X-Ray Measurements. P. H. Hermans and A. Weidinger. *J. Polymer Sci.*, 1949, **4**, 709-723. Quantitative X-ray measurements for determining the degree of crystallinity of polymers (as used earlier in cellulose determinations),[1] have been extended to the investigation of rubber, polythene and a polyamide. Strictly monochromatised copper radiation was used. Figures for the crystallinity of rubber and polythene are compared

with those of other workers.[2] It is shown that the possibility of using the background intensity as a measure of the disordered fraction is confined to not too high angles of diffraction. A method is described (and experimentally checked) that allows for reducing the curves of intensity distribution as a function of 2θ (the diffraction angle) as observed in various polymers to a comparable scale. It is further emphasised that, in polymers where hydrogen bonds play a decisive role in intermolecular cohesion, the X-ray results suggest that the crystalline or ordered fraction may to a considerable extent involve states of two-dimensional order. ([1]*J. Textile Institute*, 1948, **39**, A397; [2]*e.g.* Goppel, *J. Textile Institute*, 1949, **40**, A426.) C—**9.**

X-Ray Diffraction Pattern Measuring Instrument. J. A. Bennett. *Rev. Sci. Instruments*, 1949, **20**, 908-910. An instrument is described for measuring X-ray back reflection patterns for surface stress determinations. The chief feature of the apparatus is a curved slit in the optical system so that the beam of light which scans the diffraction ring is an arc having the same radius of curvature as the ring. This simple instrument is at least as precise as a microphotometer for these measurements and its use has resulted in a considerable saving of time. C—**9.**

Commercial Calculating Machines: Application to Scientific Computing. L. J. Comrie. *Math. Tables and Aids to Computation*, 1946, **2**, No. 16, 149-159. The development of commercial calculating machines is traced briefly and the main features of several models are indicated. The suitability or otherwise of these machines for use in scientific computing is discussed. C—**9.**

Control Chart for Largest and Smallest Values. J. M. Howell. *Ann. Math. Stat.*, 1949, **20**, 305-309. Constants are given for the use of a control chart for largest and smallest values. It is shown that, under most conditions, the chart is nearly as good as the average and range charts for detecting lack of control. C—**9.**

Mean and Standard Deviation: Rapid Calculation. ("Note sur la calcul rapide de la moyenne et de l'écart-type.") Léon Goossens. *Rayonne*, 1949, **5**, No. 11, 90-92. The simple method for the determination of the mean and of the standard deviation of a series of measurements described by Hermanne and Quintelier[1] and a method published by Yates (1949) are discussed, the worked examples on breaking load and breaking length of the first-mentioned authors being used as illustration. ([1]*J. Textile Institute*, 1950, **41**, A156.) C—9.

Population Mean: Significance Tests. ("On the Range-midrange Test and Some Tests with Bounded Significance Levels.") J. E. Walsh. *Ann. Math. Stat.*, 1949, **20**, 257-267. The properties of the range-midrange test for the population mean are investigated analytically. The results confirm that the test is very efficient for normality and small samples, and that it is not very sensitive to the requirement of normality for sufficiently small samples. In addition some significance tests for the mean are developed which have significance levels bounded near the level for normality under very general conditions. C—**9.**

Single Sampling Inspection Plans: Designing. F. E. Grubbs. *Ann. Math. Statistics*, 1949, **20**, 242-256. Tables are given for the quick determination of the acceptance number and smallest sample size for a single sampling inspection plan from large lots, when it is desired to accept 95 per cent. of lots with an acceptable fraction defective p_1, and reject 90 per cent. of lots with an objectionable fraction defective p_2. C—**9.**

Statistical Data: Truncated Normal Distributions. H. R. Thompson. *Nature*, 1950, **165**, 444. A technique is briefly explained which offers a solution to the problem of truncated normal distributions. It is claimed to be preferable to the use of regression or iterative methods employing probits. C—**9.**

Natural Rubber: Crystallinity; X-Ray Evaluation. J. J. Arlman and J. M. Goppel. *Appl. Sci. Res.*, 1949, **A2**, 1-8. A recent theory developed by Flory,[1] allows the degree of crystallisation to be calculated from thermodynamical measurements if certain parameters are properly evaluated. Such evaluation is possible by combining Wildschut's thermodynamical measurements[2] with the X-ray results presented in previous papers.[3] Thus the average length of molecule chains between cross linkages can be derived; it closely corresponds to the results of swelling measurements carried out by Gee. Other parameters are also

evaluated in agreement with their physical meaning. ([1]*J. Textile Institute*, 1947, **38**, A467; [2]1946, **37**, A223; [3]1949, **40**, A426; 1950, **41**, A100.) C—**9.**

Bacteria: Cellulose-destroying Index Determination. S. R. Sen Gupta, B. B. L. Saxena and A. N. Mukerjee. *Proc. Indian Acad. Sci.*, 1949, **30B**, 57-60 (through *Chem. Abstr.*, 1950, **44**, 697[i]). A sterilised standard piece of cotton fabric is incubated with a culture of the organism for 15 days at room temperature. Samples and controls are run at least in triplicate. The fabric is then washed, dried, conditioned at 67 per cent. R.H. for 48 hours, and the breaking load is determined. The method is applied to the evaluation of copper naphthenate for rot-proofing cotton canvas. C—**9.**

Micro-organisms: Gram Staining Reaction. M. Webb. *Research*, 1950, **3**, 113-120. The Gram technique of staining is discussed. Studies which have contributed to an understanding of the fundamental differences both in structure and function between "Gram positives" and "Gram negatives" are reviewed. There are 60 references to the literature. C—**9.**

Wood-rotting Fungi Phenol Oxidases: Action on Dyes. Kathleen Law. *Ann. Botany*, 1950, N.S, **14**, 69-78. The decolorisation of dyes by white wood-rotting fungi is attributed to a specific phenol oxidase; brown rots, which do not contain this enzyme in significant amounts, do not cause decolorisation. Some properties of the phenol oxidase of white rots have been studied and its action is shown to be similar in certain respects to that of laccase, though the substrate specificity differs. C—**9.**

Amino Acids: Microbiological Determination. Gunnar Agren. *Arkiv Kemi*, 1949, **1**, 179-185 (through *Chem. Abstr.*, 1950, **44**, 188[f]). The Henderson and Snell procedures for the determination of amino acids,[1] and Dunn's methods for alanine and glycine are adapted to the micro-scale by utilising Linderstrom-Lang's micro-techniques for studying enzyme reactions. A casein hydrolysate has been analysed for 16 amino acids and the values obtained agree with those obtained by macro-methods. ([1]*J. Textile Institute*, 1948, **39**, A170.) C—**9.**

Pectins: Analysis. ("Beiträge zur Pektinanalyse.") B. Vollmert. *Makromol. Chemie*, 1949, **3**, 140-145. A decarboxylation and titration method for determining galacturonic acid in preparations of galacturonic acid, pectic acid and pectin and a method for the simultaneous estimation of galacturonic acid and methoxyl in pectin preparations are briefly described. C—**9.**

Cellulose: Behaviour in Alkalis. ("Étude du comportement de la cellulose dans les alcalis.") J. Cyrot and R. Petit. *Bull. Inst. Textile France*, 1949, No. 14, 9-20. A study has been made of the behaviour of cellulose in sodium hydroxide solution as a function of temperature. The amount of "combined" soda is evaluated (i) by the Vieweg method, based on the change in titer on immersing cellulose in alkali solution, which admits the formation of a soda-cellulose complex or compound, and (ii) by the Gladstone method, based on the assumption that caustic soda not dissolved by absolute ethanol is "combined". The results obtained by the two methods do not agree. A new procedure, based on the difference in titers, is described and has been applied to cotton linters and wood pulp cellulose. The evaporation of the solution at high temperature falsifies the results and the tests should therefore be carried out in closed vessels. It can then be shown that the penetration of sodium hydroxide into the cellulose does not depend on the temperature but on the concentration of the caustic soda solutions. C—**9.**

Cellulose: Bromine Absorption Power Determination. T. Kleinert and F. Sieber. *Österr. Chem.-Ztg.*, 1949, **50**, 91-93 (through *Chem. Abstr.*, 1950, **44**, 325[e]). Cellulose is hydrolysed in a mixture of concentrated phosphoric and hydrochloric acids and the acid hydrolysate is brominated with 0·1 N K bromate-bromide solution. For unbleached cellulose the bromine absorption value is 0·4 to 0·7 per cent. and runs parallel to the permanganate-chlorine number. C—**9.**

Cellulose and Cellulose Esters: Influence of Functional Groups on Properties. Z. A. Rogovin, N. N. Shorygina, A. G. Yashunskaya and M. G. Trelvas. *J. Applied Chem. U.S.S.R.*, 1949, **22**, 857-864 (through *Chem. Abstr.*, 1950, **44**, 835[e]). Introduction of small amounts of carboxyl or aldehyde groups by selective oxidation (1-2 per cent. replacement of hydroxyl groups) sharply lowers the solubility of cellulose acetate and nitrate, and at 10-15 per cent. replacement the esters are insoluble; this may be due to cross linking through the residual OH

groups. This occurs more readily with COOH groups in 6-positions than with those in the 2- or 3-position; hence cellulose dicarboxylic derivatives give more soluble acetates and nitrates than the monocarboxylic derivatives of the same percentage of COOH. The positions of OH groups are also important, as translocation (as in pectic acid or methyl derivatives of monocarboxylic acetates and nitrates) leads to high solubility of the nitrates in acetone (96-100 per cent.), whereas monocarboxylic derivatives give but low solubility of the nitrate (13 per cent.). Cleavage of the pyran ring also affects ester solubility by altering chain mobility. C—**9.**

Cellulose Nitrates: Stabilisation. ("Über die Stabilisierung von Cellulosenitraten.") R. Mohr. *Makromol. Chemis*, 1949, **4**, 55-57. A critical examination has been made of stability tests for nitrocelluloses. An investigation of the causes of their instability has shown that technical products are always stable if they are absolutely free of sulphuric acid. An improved method of stabilisation uses compression instead of boiling. C—**9.**

Cellulose-Protein Compounds: Synthesis. ("Synthese von Verbindungen der Cellulose unit Eiwessstoffen.") F. Micheel and J. Ewers. *Makromol. Chemie*, 1949, **3**, 200-209. Oxycellulose has been combined with proteins by the azide method and non-degraded cellulose has been condensed with proteins by the azide method *via* the glycollic acid ether. Two types of products are obtained: in those poor in carbohydrate, each cellulose molecule is surrounded by several protein molecules; in those rich in carbohydrate there are several cellulose molecules for each protein molecule. Experimental details are given. C—**9.**

Dialdehyde-cellulose and its Esters: Preparation. A. G. Yashunskaya, N. N. Shorygina and Z. A. Rogovin. *J. Applied Chem. U.S.S.R.*, 1949, **22**, 865-873 (through *Chem. Abstr.*, 1950, **44**, 835[i]). Methods are described for the preparation of dialdehyde-cellulose and its esters. By oxidation of cellulose linters with periodic acid in the presence of sodium acetate buffer dialdehyde-cellulose was obtained. This dissolved in cuprammonium solution. No carboxyl groups were formed during the oxidation. Aldehyde determinations were made by the iodine number method of Willstätter and Schudel and by the hydroxylamine method. The products were nitrated by means of a mixture of phosphoric and nitric acids and phosphorus pentoxide. Acetylation was performed with a mixture of acetic acid and acetic anhydride in the presence of sulphuric acid. Both the nitrates and the acetates of cellulose derivatives containing aldehyde groups showed sharply reduced solubility in acetone. This was probably due to intermolecular acetal formation by means of the CHO groups and the residual hydroxyl groups. C—**9.**

Partially Alkylated Cellulose Ethers: Estimation of Primary Hydroxyl Groups by the Tosylation-Iodination Method. Tore Timell. *Svensk Kem. Tid.*, 1949, **61**, 146-155 (through *Chem. Abstr.*, 1950, **44**, 325[b]). The author shows that the tosylation-iodination method when applied to the determination of primary hydroxyl groups in propyl- and ethyl-cellulose gives reliable results if, in the tosylated preparation, the number of secondary hydroxyl groups does not exceed half of the primary ones. Tosylation proceeds rapidly for primary groups, but much more slowly for secondary groups. C—**9.**

Trimethylcellulose: Heterogeneous Hydrolysis. ("Cellulose Studies XIII.") Richard Steele and Eugene Pacsu. *Textile Research J.*, 1949, **19**, 771-783. The preparation of trimethylcellulose and its hydrolysis with 1 N HCl at 60° and 80° C., and with 0·05 N HCl at 60° C. have been studied. The course of the hydrolysis is similar in each case and a limiting degree of polymerisation (D.P.) of 60 is indicated. This suggests that the distance between acetal linkages in the periodic structure proposed for cellulose is 60 glucose residues. An equation for an apparent rate constant is derived on the assumption of first-order reaction kinetics. The apparent rate constant changes rapidly at first, but more and more slowly as the D.P. falls from 900 to 60. The order of magnitude of the limiting D.P. value, which has been determined viscometrically, has been confirmed by hypo-iodite titration. Partially methylated cellulose (30 per cent. OMe) has been hydrolysed with 2 N H_2SO_4 at 70° C. and the results confirm the topochemical nature of the methylation reaction. (For previous papers in this series see, *e.g. J. Textile Institute*, 1950, **41**, A132 and A159.) C—**9.**

Trimethylcellulose: Fractionation and Solubility. ("Cellulose Studies XIV.") Richard Steele and Eugene Pacsu. *Textile Research J.*, 1949, **19**, 784-789. Trimethylcellulose has been fractionated by mixtures of chloroform and hexane and pyridine and water. The difficulties involved are described and lead to the conclusion that neither system is suitable for such a fractionation. These difficulties are related to the solubility behaviour of methylcellulose, which is discussed in the light of present theories of polymer solubility. C—**9.**

Polysaccharides Water-insoluble Copper Complexes. ("Wasserunlösliche Kupferkomplexe von Polysacchariden.") H. Deuel and H. Neukom. *Makromol. Chemie*, 1949, **4**, 97-100. Alkaline solutions of cupric hydroxide were added to aqueous solutions of numerous polysaccharides. In many cases the formation of insoluble copper-polysaccharide complexes could be observed. Such flocculation seems to occur only if the macromolecule contains adjacent hydroxyl groups (in the *cis*-position) which are held at a small angle (less than 60°) to each other. The quadri-covalent cupric ion reacts with two glycol groups of each of two macromolecules (didiol complexes) which leads to the formation of three-dimensional networks. C—**9.**

Amines: Reaction with Nitrous Acid. J. C. Earl. *Research*, 1950, **3**, 120-127. The reaction between nitrous acid and amines is discussed and theories are reviewed; 48 references to the literature are given. C—**9.**

Amino Acid Dilituric Acid Derivatives: Optical Crystallographic Identification. Junius Larsen, C. F. Poe and N. F. Witt. *Mikrochemie*, 1949, **34**, 351-363. Derivatives of 18 amino acids with dilituric acid (5-nitrobarbituric acid) have been prepared and analysed. Optical-crystallographic data are tabulated and photomicrographs are given. In a scheme of identification of amino acids the dilituric acid derivative of the unknown is crystallised on a microscope slide and its refractive indices are determined. The test can be carried out with very small amounts of materials. C—**9.**

Amino Acids and Peptides: Separation by Electrophoresis. ("Dispositif d'électrophorèse sur papier.") G. Biserte. *Biochim. et biophys. Acta*, 1950, **4**, 416-421. An apparatus and procedure are described for the electrophoretic separation of amino acids and peptides, using filter paper (Whatman No. 1) as stabilising agent for the boundaries. The apparatus is based on that described by Consden.[1] The method is very simple and examples are given of its application to the fractionation of standard mixtures of amino acids. ([1]*J. Textile Institute*, 1946, **37**, A372.) C—**9.**

Casein: Reaction with Sugars. ("A Note on the Relative Rates of Reaction of Several Reducing Sugars and Sugar Derivatives with Casein.") V. M. Lewis and C. H. Lea. *Biochim. et Biophys. Acta*, 1950, **4**, 532-534. The rates of loss of free amino-N and the rate of development of a brown colour in mixtures of casein with various reducing sugars at *pH* 6·3, 70 per cent. R.H. and 25° or 37° C. have been studied by the methods previously described.[1] Xylose and arabinose reacted most rapidly with the protein amino groups, followed by glucose, galacturonic acid, lactose, maltose and glucuronic acid. Fructose reacted extremely slowly. Browning was most rapid with glucuronic acid, followed by the pentoses, galacturonic acid and glucose. Lactose, maltose and fructose produced no discolouration within the period of the experiments. ([1]*J. Textile Institute*, 1950, **41**, A51.) C—**9.**

Diethyl and Di-isopropyl Ethers: Peroxidation. W. Hunter and J. Downing. *J. Soc. Chem. Ind.*, 1949, **68**, 362-364. Information is given as to the rates of peroxidation of diethyl and di-isopropyl ethers under normal laboratory conditions of storage, both with and without inhibitors. Di-isopropyl ether peroxidises in daylight at least twice as rapidly, and in the dark several times as rapidly, as diethyl ether. By storing di-isopropyl ether over 20 per cent. caustic soda the ether layer can be maintained almost free from peroxide. Anti-oxidants effectively protect di-isopropyl ether for limited periods. Diethyl ether can be protected from peroxidation by storage in the presence of iron, and can be largely protected merely by storage in the dark. C—**9.**

Glucose/Casein Complex: Formation. ("Studies of the Reaction between Proteins and Reducing Sugars in the 'Dry' State", Part II.) C. H. Lea and R. S. Hannan. *Biochim. et Biophys. Acta*, 1950, **4**, 518-531. The reaction of the free amino groups of casein with glucose has been further investigated by

Van Slyke determinations at water contents corresponding to 20 per cent. and 70 per cent. relative humidity. 1:2:4-Fluorodinitrobenzene has also been used for estimation of the free amino groups. The rate of disappearance and the fate of the glucose have been followed by various procedures, including the use of the specific glucose oxidase (notatin). The nature of the casein/glucose complex is discussed in the light of these observations. (See also *J. Textile Institute*, 1950, **41**, A51.) C—**9.**

Purified Proteins: Amino Acid Composition. G. R. Tristram. *Advances in Protein Chemistry*, 1949, **5**, 83-153. Work done on the analysis of purified proteins for amino acids is reviewed under the main headings: (i) Introduction; (ii) Purposes of amino acid analysis; (iii) Methods of analysis; (iv) Establishment of accuracy and specificity of methods; (v) Comparison of analytical methods; (vi) Structure of proteins as revealed by amino acid analysis; (vii) Amino acid composition of certain proteins; and (viii) General discussion. Experimental data are presented. There are 214 references to the literature. C—**9.**

Sugar Derivatives: Alkaline Hydrolysis; Kinetics. ("The Topochemical Alkaline Hydrolysis of Cellulose Acetates," Part I.) Bernard Rabinovitch and A. E. Alexander. *J. Amer. Chem. Soc.*, 1950, **72**, 293-299. The kinetics of the alkaline hydrolysis of glucose penta-acetate, sucrose octa-acetate, cellobiose octa-acetate and the triacetyl derivative of mono-acetone glucose have been investigated by a conductivity method. The alkaline hydrolysis of sugar acetates in solution may be treated as that of a mixture of simple esters, each with its own characteristic velocity constant. Under these conditions, the primary acetate groups in glucose penta-acetate, triacetyl mono-acetone glucose and sucrose octa-acetate react at a slower rate than the glycollic secondary groups. With sucrose octa-acetate, the primary groups are made up of two types reacting at different rates. The hydrolysis of cellobiose octa-acetate can be carried out under permutoid conditions by precipitating the ester from chloroform solution in the presence of hydroxyl ions, when it behaves like glucose penta-acetate. Under other heterogeneous conditions it behaves in a radically different manner. C—**9.**

Vinyl Peroxides: Isolation and Structure. ("Role of Oxygen in Vinyl Polymerisation," Part II.) C. E. Barnes, R. M. Elofson and G. D. Jones. *J. Amer. Chem. Soc.*, 1950, **72**, 210-215. Peroxides have been isolated from aerated methyl methacrylate and from styrene, and evidence is presented that polymeric peroxides are formed when vinyl monomers react with oxygen or air. Polarograms of the peroxides have been obtained, giving information on their nature, and the structure of the peroxides is established. The suggestion that they result from an interpolymerisation of the vinyl monomer with oxygen is consistent with the inhibitory action of oxygen in vinyl polymerisations. C—**9.**

Radio-active Tracers: Application in Direct Determination of Adsorption from Solution. Eric Hutchinson. *J. Colloid Sci.*, 1949, **4**, 599-601. An account is given of the use of a radio-active tracer technique for the determination of the quantity of solute adsorbed on aqueous solutions of sodium dodecyl sulphate. C—**9.**

Dissolved Thread Molecules: Size and Shape; Determination by Physical Methods. ("Physikalische Methoden zur Bestimmung der Grösse und Form von Fadenmolekülen in Lösung.") H. A. Stuart. *Makromol. Chemie*, 1949, **3**, 176-199. After a general consideration of the shape of thread molecules, methods for the determination of their size and shape are discussed, in particular the dependence of characteristics such as sedimentation rate, diffusion constant, polarisation, electric and magnetic double refraction, molecular light scattering, viscosity, and streaming birefringence on degree of polymerisation and shape. Methods for the investigation of branching and of the microform are also considered. There are over 40 references to the literature. C—**9.**

High Polymers: Solubility. ("Contribution à la thermodynamique des solutions de hauts polymères, II. Solubilité des hauts polymères.") Michel Magat. *J. Chim. Phys.*, 1949, **46**, 344-354. Some semi-quantitative applications are discussed of the equations expressing the partial molal free enthalpies of solutions of macromolecules with flexible chains, particularly to the problem of the solubility of high polymers. The classification of solvents and polymers according to the density of their cohesive energy permits the grouping and the prediction of the behaviour of the solvents of different polymers. Mixed solvents may be treated,

in a first approximation, as simple solvents having properties (cohesive energy and molal volume) intermediate between those of the components. However, the semi-quantitative evaluations are only possible in the absence of preferential adsorption. By way of example, some experimental results concerning the precipitation thresholds, solubility, distribution of the polymer between solution and coacervate, *etc.*, have been compared with theoretical predictions. The agreement is generally satisfactory, taking account of the very approximate character of the theoretical calculations. C—**9.**

Threadlike Molecules: Mean Separation of Chain Ends. G. Porod. *Monatshefte für Chemie*, 1949, **80**, 251-255 (through *Chem. Abstr.*, 1950, **44**, 22[d]). The author evaluates the properties of threadlike molecules in terms of the "persistence length" $a = l/(1-K)$, where l is the length of a single link in the molecular chain and $K = \cos\alpha$, the mean value of the cosine of the valence angle between successive chain atoms; a can be expressed geometrically as the distance between the centres of gravity of the first and last units of the chain as the chain assumes all possible configurations. The centres of gravity of all the intervening atoms lie on this line, which is an extension of the first chain unit. As the number of chain units, n, approaches infinity, a approaches a limit given by $l/(-\ln K)$. A point S units from the first chain unit will have its centre of gravity a distance Z along a, where $Z = a(1-e^{-s/a})$; when $S \rightarrow \infty$, $Z \rightarrow a$. The mean separation of chain ends r^2 is given by: $r^2 = 2a(S-Z)$. Use of the "persistence length" has the advantage that a is experimentally accessible, and for paraffin chains appears to be about 12 chain units. C—**9.**

Water-soluble Cellulose Ethers: Use as Emulsifying Agents. R. I. Morrison and B. Campbell. *J. Soc. Chem. Ind.*, 1949, **68**, 333-336. The emulsifying powers of various water-soluble cellulose ethers for mineral and vegetable oils are compared. The advantages of mixtures of sodium carboxymethylcellulose with other water-soluble cellulose ethers in producing improved emulsions with reduced foam are shown. Consideration is given to the relative interfacial tensions of methylethylcellulose and sodium carboxymethylcellulose and to the effects of temperature and hydrogen ion concentration on emulsions prepared from them. Experimental data are presented. C—**9.**

Vinyl Chloride: Kinetics of Polymerisation. ("Über die Polymerisationskinetik des Vinylchlorids.") E. Jenckel, H. Eckmans (née Mettegang) and B. Rumbach. *Makromol. Chemie*, 1949, **4**, 15-40. The rate of polymerisation of vinyl chloride has been studied at 50° C., with varying amounts of benzoyl peroxide as catalyst; conversion, molecular weight, and duration of time until turbidity sets in due to precipitation of the polymerisation product, have been determined. Polymerisation proceeds relatively slowly at first, becomes gradually more rapid, and after 80-90 per cent. conversion becomes much slower; complete conversion cannot be attained. Increasing amounts of catalyst accelerate the reaction rate. The degree of polymerisation decreases markedly with increasing amounts of catalyst and of oxygen. The time elapsed until turbidity sets in varies in inverse proportion to the square root of catalyst concentration; in an atmosphere of oxygen it is greater, and in nitrogen smaller than in air. The catalyst disappears during polymerisation, and this the more the higher is its initial concentration and the less the higher is the amount of oxygen. A reaction mechanism is proposed and the steps involved in the reaction are represented schematically. The hindering effect exercised by styrene and some other substances on the polymerisation is briefly reported. C—**9.**

Colloids: Measurement of Small Osmotic Pressures. ("Technisches über Kolloidmessungen. I. Die Messung sehr kleiner osmotischer Drucke.") H. H. Weber; H. Portzehl. *Makromol. Chemie*, 1949, **3**, 132-139. An arrangement is described which permits the measurement of small osmotic pressures with a precision of a few hundredths of mm. Hg. Wrong equilibria in the pressure adjustment are avoided by using a very permeable osmometer membrane, and a capillary with constant bore (20 mm.) throughout. Data on the effect of time and cleansing on the capillarity of ascending tubes of different diameters, and on the precision of the microscopical reading of ascension heights, are tabulated. C—**9.**

Reduced Keratin Solutions: Electrodialysis. C. G. Fink and H. A. Golle. *J. Electrochem. Soc.*, 1950, **97**, 59-62. Reduced keratin solutions have been electrodialysed so as to remove ions that contain sulphur, primarily thiosul-

phate and sulphide ions. The degree of purification is proportional to the quantity of electricity passed through the cell and independent of temperature. At a fixed current density, decrease in yield is proportional to the time of electrodialysis. The apparatus and experimental technique are briefly described. Nickel anodes and graphite cathodes are suitable electrodes. C—**9.**

Photo-electronic Counter for Colloidal Particles: Application in Size-distribution Studies. F. T. Gucker and C. T. O'Konski. *J. Colloid Sci.*, 1949, **4**, 541-560. An illustrated description is given of an improved photo-electronic counter employing right-angle light scattering, with a new optical system in which stray light has been reduced to an extremely low level. Studies of various light sources show that the ribbon-filament tungsten lamp with its uniformity, stability, and large area, is most suitable. Design considerations influencing the determination of particle-size distribution of aerosols with the instrument are discussed, and electronic circuits are described, capable of counting those pulses within a pre-determined and adjustable size range. Test of sulphur aerosols made by spraying monodisperse sulphur sols showed that particles of 1·0 μ diameter can just be detected. C—**9.**

Polystyrene Concentrated Solutions: Thermodynamic Properties. M. J. Schick, Paul Doty and B. H. Zimm. *J. Amer. Chem. Soc.*, 1950, **72**, 530-534. The osmotic pressures of polystyrene solutions have been measured at different temperatures over the concentrated solution range of approximately 0·5 to 11 per cent. in toluene, butanone, ethyl acetate and cyclohexane. Heats and entropies of dilution are calculated. Small negative heats of dilution are obtained for toluene and butanone solutions. A trend towards normal positive values is indicated by the results at higher concentrations. The entropy of dilution of cyclohexane solutions is high enough to be in the range predicted by statistical theories. The values in other solutions are very low—in the vicinity of zero—in conflict with theory. C—**9.**

Cellulose: Cuprammonium Viscosity; Measurement with Hoeppler Viscosimeter. W. O. Hisey and C. E. Brandon. *Paper Trade J.*, 1945, **120**, *TAPPI*, 11-20, 21-24. A study has been made of the Hoeppler viscosimeter for measuring the viscosity of cellulose dispersed in cuprammonium solution. The effects of variables are shown in graphs and tables. The Hoeppler viscosimeter was found to be very satisfactory and tests made with it have an inherent error about half as great as tests made by the *TAPPI* standard method. C—**9.**

Celluloses and Cellulose Nitrates: Values of the Staudinger Constant. ("Über die K_m-Werte von Zellstoffnitraten und Zellstoffen.") F. Zapf. *Makromol. Chemie*, 1949, **3**, 164-175. Viscometric and osmometric measurements have been carried out on fractionated wood cellulose nitrates and cotton cellulose nitrates. Distribution curves are presented which indicate that the wood cellulose nitrate consists of two components whereas the polymer-homologous mixture of cotton cellulose nitrates results from a uniform cellulose. It is shown that the nitrates are obtained by polymer-analogous conversion and that the distribution functions are therefore also valid for the original celluloses. Values of viscosity numbers and K_m (Staudinger constant) are tabulated for cotton and wood celluloses and their nitrates and it is shown that the K_m-constant for cotton cellulose cannot be applied to wood celluloses. C—**9.**

Polystyrenes: Viscosity and Molecular Size and Shape. ("Das Viskositätsverhalten der Polystyrole im Zusammenhang mit der Grösse und Gestalt der Moleküle.") G. V. Schulz. *Makromol. Chemie*, 1949, **3**, 146-163. Polystyrenes differ from other vinyl polymers in that they obey Staudinger's viscosity law in good solvents, the value of the K_m constant being dependent upon the polymerisation conditions. In poor solvents the polystyrenes behave exactly like other vinyl polymers. A new interpretation of the different K_m values is proposed, which is based on the fact that each monomer can be attached in the *l*- or *d*-form. At low temperature chain-molecules with alternating *l*- and *d*-bonds are formed, which are fairly rigid in good solvents and hence only weakly coiled. At higher temperatures *d*-*d*-, or *l*-*l*-groups respectively, are formed, which cause sharp and rigid bends in the chain molecules and thus reduce the K_m constant. In peroxide polymerisation also branching takes place. C—**9.**

Luminescence: Review of Literature. G. R. Fonda. *J. Electrochem. Soc.*, 1950, **97**, No. 1, 3C-7C. In a brief review of the literature on luminescence pub-

lished during 1949 attention is paid to new phosphors (luminescent materials), the preparation of phosphors, phosphor characteristics, thermoluminescence and phosphorescence, and characteristics of luminescent screens; 55 references are given. C—**9.**

Amino Acids: Raman Spectra. J. T. Edsall, J. W. Otvos and Alexander Rich. *J. Amer. Chem. Soc.*, 1950, **72**, 474-477. Raman spectra are reported for the cationic forms of cysteine and cystine, for glycylglycine, lysine, histidine, and some β-, δ- and ϵ-amino acids. Most of the substances are studied both as dipolar ions and as cations in aqueous solution. The characteristic S–H, C–S and S–S vibrations are identified in cysteine and cystine. A brief discussion is given of certain features in the spectra of glycylglycine and the other amino acids studied. C—**9.**

Trimethylcellulose, Cellulose and Starch: Infra-red Spectra. ("Cellulose Studies XV.") Richard Steele and Eugene Pacsu. *Textile Research J.*, 1949, **19**, 790-793. A technique for mounting films and obtaining their infra-red spectra in a dry state is described. A solution of the material is evaporated on a clean mercury surface. The spectra of trimethylcellulose, cellulose and starch are presented and discussed. C—**9.**

Metals: Friction and Lubrication; Importance of Surface Oxide Films. E. D. Tingle. *Trans. Faraday Soc.*, 1950, **46**, 93-97, 97-102. (1) *The Dry Friction of Surfaces Freshly Exposed to Air*:—A new "cutting" technique for surface preparation is used to demonstrate the effect of the surface oxide film on the friction and lubrication of metals. With unlubricated surfaces the oxide film generally produces a marked reduction in friction even though the period of exposure to the atmosphere of a freshly cut surface is only a few seconds. With subsequent growth of the film there is further reduction, but the effect is less marked. Experiments indicate that the thin layer of oxide immediately adjacent to the surface plays a more significant part in reducing the friction than the thicker layers of oxide above it. (2) *The Formation of Lubricating Films on Metal Surfaces.* Experiments with lubricated surfaces emphasise the importance of chemical attack in boundary lubrication by fatty acids and demonstrate the essential part played by the oxide film in the formation of the lubricating layer. The combined action of water and atmospheric oxygen on the surface of a reactive metal is often able to produce a penetrable film which will react with a fatty acid to give an effective lubricating layer. The lubricating properties of long-chain fatty acids on three main classes of metals is explained. C—**9.**

Surface Replicas: Preparation for Electron Microscopy. ("Elektronenmikroskopie der Oberflächen grober Teilchen.") R. Signer, H. Pfister, and H. Studer. *Makromol. Chemie*, 1949, **4**, 50-54. In the course of a comparative electron-microscopical investigation of textile fibres, the reliability of the polystyrene-silica replica technique of Heidenreich and Peck[1] has been examined. Vanadium pentoxide rods were used in the tests. It is shown that the contrast is greatly improved if a film of gold is deposited obliquely on the silica film. Contrast is also improved by depositing the silica vapour obliquely on the polystyrene, but the shape of the rods is strongly distorted. A much more plastic and accurate image is obtained by the shadow-cast technique of Williams and Wyckoff.[2] The conclusion is drawn, however, that the polystyrene-silica technique provides a reliable means for observing the surface structure of particles not smaller than 200A. ([1]*J. Textile Institute*, 1943, **34**, A273; [2]1946, **37**, A220.) C—**9.**

Micro-biological Objects: Mass Determination by X-Ray Absorption. Arne Engström and Bo Lingström. *Biochim. et Biophys. Acta*, 1950, **4**, 351-373. A method for the determination of the mass of small biological objects such as single cell structures is based upon absorption measurements of soft filtered continuous X-rays. From absorption data the mass can be calculated. The complete theory of the method is given. An X-ray equipment for the mass determination is described in detail and illustrated. A few biological applications are described. C—**9.**

Fractional Replication Arrangements for Factorial Experiments with Factors at Two Levels. K. A. Brownlee, B. K. Kelly and P. K. Loraine. *Biometrika*, 1948, **35**, 268-276. The paper describes the solutions of practical interest for the 2^{6-m} experiment, [*i.e.* the $(n-m)^{th}$ replicate of n factors, each at two levels, necessitating the use of 2^m plots]. Also included are two derived solutions where one and two factors, respectively, are at four levels. The enumeration of sub-

groups is carried out by means of a crude symbolism. Designs for 16, 32, 64, and more than 64 plots are derived and tabled by numbers of factors involved, order of replication, generators of alias sub-group, main effects having as aliases interactions of order r, and so on. C—**9.**

Harmonic Analysis: Tests of Significance. H. O. Hartley. *Biometrika*, 1940, **36**, 194-201. The paper is an answer to criticism by Kendall (1946) of classical harmonic analysis and the related periodogram analysis. The criticism is that the tests of significance used are based on the assumption of a random series and are therefore hardly applicable. The author shows that most of the difficulties can be overcome by using tests in which the periodogram intensities are independent or slightly correlated, and by applying some recent results in analysis of variance test distributions. C—**9.**

Non-orthogonal Tri-factorial Experiment: Statistical Analysis. W. L. Stevens. *Biometrika*, 1948, **35**, 346-367. Data are presented from a biological experiment in which no attempt was made to ensure orthogonality or even balanced non-orthogonality. The proper design for an experiment with the same material is discussed. The methods for the statistical analysis for the data are then explained by means of the arithmetical computations laid out in such a form that the routine can be understood and hence applied to other examples. C—**9.**

Poisson, Binomial, and Negative-Binomial Data: Transformation. F. J. Anscombe. *Biometrika*, 1948, **35**, 246-254. Optimum values are derived for the constants in the transformations of Poisson, binomial, and negative-binomial data proposed by Bartlett (1936) and Beall (1942). The effect of these transformations for small values of the mean is shown numerically. C—**9.**

Relationship between Finite Groups and Completely Orthogonal Squares, Cubes and Hyper-cubes. K. A. Brownlee and P. K. Loraine. *Biometrika*, 1948, **35**, 277-282. Given that completely orthogonal squares of side n afford a method of introducing $(n+1)$ factors each at n levels into an experiment involving n^2 plots instead of the n^{n+1} necessary for a full-scale factorial experiment, it is natural to estimate how far interactions between pairs of factors would affect the analysis of main effects of the other factors. Formulation of completely orthogonal squares of prime side, and also sides 4 and 8 is carried out. It is pointed out that in the orthogonal square design, it is essential that no pair of factors should interact, and further investigations for more suitable designs are pursued. It is found that Latin, Graeco-Latin and completely orthogonal hyper-cubes are such that high-order interactions have low aliases. C—**9.**

Serial Correlation Coefficients: Testing. M. H. Quenouille. *Biometrika*, 1948, **35**, 261-267. A good approximation to the distribution of the first serial correlation coefficient is derived for variates connected by a linear Markoff scheme with normal error distribution. The results of a number of examples indicate that the approximate normal theory provides a satisfactory test for serial correlation coefficients if the number of observations is sufficiently high. C—**9.**

2 × 2 Tables: Power Function of the Test on a Randomised Experiment. E. S. Pearson and Maxine Merrington. *Biometrika*, 1948, **35**, 331-345. Since the 2 × 2 table may appear as the summary of several different types of experiment, the differing analytical attacks arise from the alternative probability constructs used to provide a basis for inference. The experiment considered is the 2-treatment, quantal-response type and the question asked is, "In what sense is it possible to interpret a difference in treatments and how can we measure the power of the test to detect such a difference?" For simplification W, the number of items which only react if given treatment A, is assumed zero and the null-hypothesis put forward is that Y, the number of items which only react if given treatment B, is zero. The critical limit for a, the number reacting under treatment A, is denoted as $a(\alpha,r,N,m)$, where α is the probability of falling at or below the limit if $Y=0$, r is the total of reactions in N items and m, the total responses to treatment B. The problem is that of determining the probably $P\{a \leqslant a(\alpha,r,N,m)\}$, if $Y>0$, where both a and r are random variables. C—**9.**

Time Series: Significance of the Serial Correlation Coefficient. ("Some Theorems on Time Series," Part II.) P. A. P. Moran. *Biometrika*, 1948, **35**, 255-260. Expressions are derived for the exact values of the lower moments of

the sampling distributions of various definitions of the serial correlation coefficient under the assumption that successive elements of the time series are in fact independent. C—**9.**

Potato Starch: Use as Substrate for Determination of Diastatic Activity. J. Blom and B. Schwarz. *J. Inst. Brewing*, 1950, **56**, 58-62. Native potato starch is better than soluble starch as a substrate in determinations of diastatic activity, and may be considered as a well-defined standard. The inconvenient viscosity of potato starch paste is eliminated by a short treatment with very dilute hydrochloric acid or mechanical treatment. Investigations have been made covering 18 samples of native potato starch. The results of determinations of diastatic activity with the same preparation of amylase deviate less than with samples or soluble starch, the standard error being ±1 per cent. for potato starch and ±5 per cent. for soluble starch. C—**9.**

Copper: Detection and Estimation by Means of Direct Green B. ("Le Vert Direct B, réactif du cuivre.") Canon J. Pinte and (Miss) —. Essertel. *Bull. Inst. Textile France*, 1949, No. 15, 63-68. Tests have been carried out in order to investigate the possibility of using Direct Green B, which changes from green to a greyish red in the presence of traces of Cu, in the colorimetric determination of copper. A procedure for a qualitative determination is described. Colorimetric curves have been established for solutions of varied Cu content. The variation in height of the single ordinate in the red permits the estimation of traces of copper. C—**9.**

Metals and Acid Radicals: Separation and Detection by Paper Chromatography. ("Inorganic Chromatography on Cellulose" Part II.) F. H. Burstall, G. R. Davies, R. P. Linstead and R. A. Wells. *J. Chem. Soc.*, 1950, 516-528. A detailed description is given of a method for the separation and detection of a number of metallic ions and acid radicals by extraction with organic solvent mixtures on strips or sheets of absorbent paper and spraying with appropriate reagents that give characteristic coloured bands. Methods of separating the common metals are described and the isolation of the constituents of mixtures containing some of the less common metals is also included. Chromatograms are illustrated. R_F values have been determined in a number of cases and the significance of these measurements is discussed. C—**9.**

Plant Tissue: Magnesium Content; Micro-chemical Determination. A. J. Sterges and W. H. MacIntire. *Anal. Chem.*, 1950, **22**, 351-353. A thiazole yellow procedure is proposed for the rapid and accurate micro-determination of the Mg content of plant tissue, without removal of other ions or addition of compensating solutions. Experimental data are shown to be in good agreement with the results obtained by a standard method. C—**9.**

Amino Acids: Analysis by Paper Chromatographic and Indicator Techniques. ("Determination of Organic Compounds as Isotopic Derivatives.") A. S. Keston, Sidney Udenfriend, and Milton Levy. *J. Amer. Chem. Soc.*, 1950, **72**, 748-753. A method is described for the estimation of glutamic acid, aspartic acid, hydroxyproline, serine and threonine in 0·2-1·2 mg. of hydrolysed protein. Paper chromatography is applied to the separation of the *p*-iodobenzenesulphonyl derivatives formed from the protein hydrolysate products with a reagent containing ^{131}I. The recovery is measured by the use of indicators consisting of known *p*-iodobenzenesulphonyl derivatives containing ^{35}S which are added in known amounts immediately after forming the ^{131}I derivatives of the amino acids. Radio autograms are used to locate the bands, and constancy of ^{131}I to ^{35}S ratios in successive portions of the bands provides a test of the validity of the analysis. C—**9.**

Natural and Synthetic Rubbers: Analysis. Norman Bekkedahl. *Anal. Chem.*, 1950, **22**, 253-264. A review is given of work published during 1949 on the analysis of natural and synthetic rubbers, including chemical and physical testing methods. There are 266 references to the literature. C—**9.**

Nitrogen in Organic Compounds: Kjeldahl Determination. P. L. Kirk. *Anal. Chem.*, 1950, **22**, 354-358. Investigations of the effect of digestion conditions in the Kjeldahl method are discussed. Micro- and ultramicro-methods are described, with apparatus. There are 33 references to the literature. C—**9.**

Organic Microchemistry: Developments. C. O. Willits and C. L. Ogg. *Anal. Chem.*, 1950, **22**, 206-210. A review is given of developments during 1949 in organic microchemistry, including methods of analysis and apparatus. There are 108 references to the literature. (See also *J. Textile Institute*, 1949, **40**, A174.) C—**9.**

Plastic Coating Materials: Analysis. T. G. Rochow and R. W. Stafford. *Anal. Chem.*, 1950, **22**, 206-210. A review is given of developments during 1949 in the analysis of plastic coating materials. These include general and specific methods for the analysis of high-polymeric materials, oils, pigments, and individual coating constituents. There are 105 references to the literature. C—**9.**

Hydrogen Peroxide: Energy of the O-O Bond. Paul A. Giguère. *Canadian J. Res.*, 1950, **28** B, 17-20. A critical review is given of published estimates of the O-O bond energy in hydrogen peroxide. The valence-state energy of the oxygen atom, calculated recently by Pauling, agrees with the lower value, 35 kcal. per mole, for the O-O bond energy. C—**9.**

Cellulose: Esterification of Primary and Secondary Hydroxyls With *p*-Toluenesulphonyl Chloride. Emil Heuser, Merle Heath and W. H. Shockley. *J. Amer. Chem. Soc.*, 1950, **72**, 670-674. A chemically reactive cellulose was prepared by regeneration from cellulose xanthate solution, the water in the swollen structure being removed successively with methanol, ethyl ether, and cyclohexane. Two series of heterogeneous esterifications with *p*-toluenesulphonyl (tosyl) chloride in pyridine were made on two such cellulose samples. The products were treated with sodium iodide in acetonylacetone to replace the tosyl groups on primary alcoholic positions by iodine. From the data, the reaction for both primary and secondary alcoholic groups of cellulose was proportional to the concentration of such groups, the rate constant for substitution on the primary position being 5·8 times that for the secondary position. C—**9.**

Cellulosic Materials: Industrial Hydrolysis. ("Le problème industriel de l'hydrolyse des matières cellulosiques.") Rodolphe Orel. *Chimie et Industrie*, 1949, **62**, 555-569. A detailed study is presented of the main technical and economic aspects of the acid hydrolysis of wood. The apparatus and its operation are described and illustrated and balance sheets of raw material, heat and energy consumption are drawn up. Optimum yield and cost-price of the final product have been calculated. C—**9.**

Degraded Wood Celluloses: Fission Points. ("Über Lockerstellen in oxydativ und hydrolytisch abgebauten Holzcellulosen.") E. Huseman and M. Goecke. *Makromol. Chemie*, 1949, **4**, 194-207. By means of an investigation of the chain length distribution of beech- and pine-wood celluloses, degraded by oxidation in cuprammonium oxide solution, it is shown that, as with cotton and ramie celluloses,[1] a homogenisation of the degree of polymerisation takes place between 400 and 500. This effect is also observed with hydrolytically degraded wood celluloses, but cannot be evaluated quantitatively because of viscosity anomalies. The findings lead to the conclusion that wood celluloses contain easily cleavable bonds at intervals of about 500 glucose residues, which are split considerably more rapidly by oxidising agents and acids than the β-glucosidic linkages. This periodic structure is the same for all types of cellulose investigated in so far as the distance between the easily cleavable bonds is concerned, but the speed of cleavage differs. Electron micrographs indicate that these bonds are arranged in planes perpendicular to the fibre axis. ([1]See *e.g. J. Textile Institute*, 1947, **38**, A454.) C—**9.**

Nitrocellulose: Interaction with Solvents. W. R. Moore. *J. Polymer Sci.*, 1950, **5**, 91-109. The interaction of fibrous nitrocellulose and certain solvents has been studied by means of the absorption of the solvent from a mixture of solvent and hexane, by swelling and dissolution in such binary mixtures, by precipitation from solution by hexane, and by means of viscosity measurements on dilute solutions. Absorption and swelling phenomena indicate that penetration in the amorphous or crystalline regions of the fibre is dependent on the size of the solvent molecules. The results of swelling, viscosity and precipitation measurements indicate that interaction is related to the cohesive energy density of the solvent. The usual theories of polymer-solvent interactions, applicable to cases where there is absorption of heat by mixing, can be equally applied to interactions between solvated nitrocellulose and solvent. C—**9.**

Corn Starch and Fractions: Action of Nitrogen Dioxide. R. W. Kerr. *J. Amer. Chem. Soc.*, 1950, **72**, 816-820. The reaction between gaseous nitrogen dioxide and corn starch and its fractions in the solid state has been studied. The percentage of uronic acid carboxyl groups found in amylose after oxidation was greater than in oxidised amylopectin; whole starch gave an intermediate value. The results support the view that branching through glucosidic linkages to carbons number 6 is more extensive in amylopectin than in amylose molecules. The physical form of the carbohydrates, as well as moisture associated with, or formed in the starch, influences the oxidation reaction rate. Moisture also facilitates hydrolysis of glucoside linkages which makes possible the formation of saccharic acid groups at the points of scission. Carbon-6 carboxyl groups in saccharic acid are relatively more stable in a decarboxylation reaction with hydrochloric acid than uronic acid carboxyls. C—**9.**

Multi-linked Polyamides: Preparation and Properties. J. R. Schaefgen and P. J. Flory. *J. Amer. Chem. Soc.*, 1950, **72**, 689-701. Fibrous polyamides with 4- and 8-membered chains have been converted to network structures by reaction of their terminal carboxyl groups with stoichiometric proportions of hexamethylenediamine. These "multilinked" polyamides possess at room temperature many of the properties characteristic of linear and multichain polyamides such as high crystallinity, ability to be orientated to form strong fibres, and high melting points. At temperatures above the melting point of the crystallites they possess a rubber-like elasticity and in this respect are very similar to natural rubber. Stress/strain curves and equilibrium swelling volumes in *m*-cresol are recorded. C—**9.**

High Polymers: Molecular Weight Distribution Measurement. F. W. Billmeyer and W. H. Stockmayer. *J. Polymer Sci.*, 1950, **5**, 121-137. Based upon the suggestion of Spencer,[1] a method for estimating the breadth of the molecular weight distribution of a high polymer has been devised: a polymer solution is divided into aliquot parts and some of the polymer in each part is precipitated with non-solvent so that the range from complete solution to complete precipitation is covered. The mass and weight-average molecular weights of each precipitate are measured. From these data the distribution breadth is estimated in terms of a parameter *H*, which in a theoretical discussion is related to other parameters of distribution breadth. A number of experiments with polymethyl methacrylates are described and the results discussed with reference to polymerisation kinetics. Sources of error in both the theoretical and experimental treatments are discussed. ([1]*J. Textile Institute*, 1949, **40**, A39.) C—**9.**

High Polymer Molecules: Breakdown. H. W. Melville. *Science Progress*, 1950, **38**, 1-9. The mechanism of the breakdown of high polymer molecules is discussed. The thermal degradation of polymethyl methacrylate is shown, form molecular weight determinations (on the breakdown products) and from observations of the effect of possible inhibitors, to proceed by a chain mechanism that is modified according to the molecular weight of the polymer. The determination of the point at which thermal fission takes place, and the use of energetics as a source of information are discussed and mention is made of degradation by means of supersonic radiation. C—**9.**

Pectin Esters and Guar Galactomannan: Structure. K. J. Palmer and Merle Ballantyne. *J. Amer. Chem. Soc.*, 1950, **72**, 736-741. Pectin esters and guar galactomannan have been examined by X-ray diffraction techniques. The small-angle diffraction from pectin acetate, propionate, butyrate, laurate, myristate and palmitate esters are recorded. The increase in interchain separation per carbon atom in the ester chain is 0·78A. This is interpreted to indicate that the aliphatic chains are perpendicular to the plane of the pyranose rings and make an angle of 35° with the polygalacturonide chain axis. The measured densities of the esters are in good agreement with the densities calculated on the assumption that the volumes of the pectinic acid and aliphatic acids are additive. A method is described for producing highly orientated films from the galactomannan obtained from guar. The X-ray diffraction investigation of these orientated films shows that the galactomannan chains have a fibre identity period of 10·3A. Two probable structures for the guar galactomannan chain are described and illustrated. C—**9.**

Softwood Lignin: Isolation and Properties. ("Investigations on Lignin and Lignification." Part I.) W. J. Schubert and F. F. Nord. *J. Amer. Chem. Soc.*,

1950, **72**, 977-981. The net effect of the action of the "brown rot" wood destroying fungi, *Lentinus lepideus*, *Poria vaillantii* and *Lenzites sepiaria* on white Scots pine and white fir woods is a depletion in the cellulose composition of the wood, together with an accompanying increase in the relative content of lignin. After seven months of decay by *Lentinus lepideus* there is approximately a two-fold increase in the yield of alcohol-extractable lignin from the decayed wood in relation to that obtained from sound wood of the same species. Data are presented which indicate that native lignin is a chemical entity which is identical in various species of softwoods. Lignin preparations isolated with 70 per cent. H_2SO_4, fuming HCl or 10 per cent. NaOH do not resemble native lignin in chemical composition nearly so closely as the lignin obtained after enzymatic decay of the wood. A possible mechanism of lignification is discussed. There is evidence that there is a physical, not a chemical, union between cellulose and lignin in wood and that the cellulosic fraction in wood serves as the starting-point in the carbohydrate-lignin transformation. C—**9.**

Styrene: Emulsion Polymerisation. ("The Disappearance of Unadsorbed Soap During the Emulsion Polymerisation of Styrene.") M. L. Corrin. *J. Phys. & Colloid Chem.*, 1950, **54**, 265-270. The concentration of unadsorbed soap as a function of polymer yield has been determined for initial concentrations of K laurate (2) and K myristate (1) in the emulsion polymerisation of styrene. These results are based on the fluorescent dye technique: calculations involve the monomer: polymer ratio and the adsorption isotherms of the soaps. **C—9.**

Pendent-drop Apparatus for Surface and Interfacial Tensions. H. W. Douglas. *J. Sci. Instruments*, 1950, **27**, 67-69. Constructional details are given of a two-part thermostat and a syringe holder for use with a Pyrex syringe and tip and a rectangular optical cell employed in the measurement, by the pendent-drop method, of the boundary tension of liquid/gas and liquid/liquid systems. A brief account is also given of the optical system employed and of the method by which the tensions have been evaluated. **C—9.**

Collagen and Leather: Adsorption of Water Vapour; Influence of Temperature. J. R. Kanagy. *J. Res. Natl. Bureau Standards*, 1950, **44**, 31-45. The adsorption of water vapour by collagen, commercial hide powder, and several leathers has been determined at various relative humidities ranging from about 0 to 96 per cent., at 28°, 50° and 70° C. Determinations have also been made on chestnut and quebracho tannins. From the results, heats of adsorption have been calculated by means of the Clausius-Clapeyron and Brunauer, Emmett and Teller equations. Free energy and entropy values for the adsorption at 50° C. are given. The effect of high temperatures on moisture adsorption has been studied. Methods are given for estimating moisture content under conditions that have not been studied experimentally. The change of water adsorption with temperature can be expressed by a simple relation. Results are discussed. C—**9.**

Colloids: Ageing. ("Le vieillissement des colloïdes.") W. Kopaczewski. *Chimie et Industrie*, 1950, **63**, 27-33. A number of examples of the ageing of colloids has been investigated. A study of the phenomena described and illustrated leads to the conclusion that ageing is linked with the state of dispersion of the colloid. There are 40 references to the literature. C—**9.**

Dodecylammonium Chloride: Critical Micelle Concentration; Effect of Alcohols and Salts. S. H. Herzfeld, M. L. Corrin and W. D. Harkins. *J. Phys. & Colloid Chem.*, 1950, **54**, 271-283. It shown that within an experimental error of 5 per cent. the critical concentration of dodecylammonium chloride is a linear function of alcohol concentration for the C_2 to C_{11} alcohols. The rate of change of critical concentration with alcohol concentration is smaller for branched-chain alcohols than for their straight-chain isomerides. The logarithm of the derivative of the critical concentration with respect to the alcohol concentration is a linear function of the chain length for C_3 to C_{10} alcohols. The critical concentration of dodecylammonium chloride has been measured as a function of the concentration of both added long-chain alcohols (*n*-hexanol and *n*-decanol) and of potassium chloride. The effect of alcohol and the effect of salts are essentially additive. The general method required for theoretical analysis of the alcohol and salt effect is outlined. C—**9.**

Elastic Viscous Oleate Systems Containing Potassium Chloride: Effect of n-Primary Alcohols. H. G. Bungenberg de Jong and H. J. van den Berg. *Proc. Kon. Ned. Akad. Wet.*, 1950, **53**, 109-121. The influence of the first

six members of the series of *n*-primary alcohols on the elastic behaviour of a 0·6 per cent. oleate system at the KCl concentration of minimum damping, has been investigated. Results are expressed by graphs that show the relationships between the elastic shear modulus (G) and quantities which refer to the damping (λ, Λ, n,) for each alcohol. G-λ, G-$(1/\Lambda)$ and G-n graphs are used, being representations in which the concentration of the alcohol plays no part, and which express the distribution of alcohol molecules between oleate micelles and medium. The alcohols may be arranged in the order C6>5>4>3>2>1 in which from right to left the above distribution shifts strongly in favour of the oleate micelles. (For previous papers see *J. Textile Institute*, 1950, **41**, A228.) C—**9.**

Macromolecular Solutions: Statistical Theory. ("Zur statistischen Theorie makromolekularer Lösungen.") (1) J. H. van der Waals; (2) A. Münster. *Makromol. Chemie.*, 1949, **4**, 105-112, 113-116. A discussion is given of the formulæ obtained by Münster[1] and Schulz[2] for the entropy of dilution of dilute macromolecular solutions. For large spherical solute molecules both authors find results slightly different from that which can be predicted from the classical theory of gases. According to Schulz, and contrary to the results of other authors, molecular flexibility should have a considerable influence on the entropy of dilution of chain molecules. This discrepancy originates from a slip in his calculations, correction of which leads to an entropy of dilution equal to that found for rigid chain molecules. (2) Münster replies to van der Waals' criticism and makes some remarks on the relation between the osmotic pressure and the flexibility of thread-like molecules. ([1]*J. Textile Institute*, 1949, **40**, A416; [2]1947, **38**, A454.) C—**9.**

Polyvinyl Alcohol: Anisotropy in the Amorphous Part. Caroline H. Mac Gillavry. *Rec. Trav. Chim.*, 1950, **69**, 509-514. The amorphous ring in the fibre diagram of polyvinyl alcohol is anisotropic; its intensity is shown to be greatest near the equator and smallest if measured in the fibre direction. This anisotropy is discussed on the basis of the fringe-micelle theory. C—**9.**

Thread-like Molecule Solutions: Entropy of Dilution. ("Über die Verdünnungsentropie der Lösungen von Fadenmolekülen.") G. V. Schulz. *Makromol. Chemie*, 1949, **4**, 117-123. A statistical calculation carried out previously[1] (and now corrected) shows that the entropy of dilution of a solution of thread-like molecules depends on the axial ratio only, and not on their rigid or inward movable condition. On comparing the result of this calculation with the direct determinations of entropy of dilution by means of osmotic measurement, it appears that the latter is throughout considerably lower than was expected. From this the conclusion may be drawn that the entropy of dilution depends largely on processes which take place between the solute and the solvent in the "solvate sheath". ([1]*J. Textile Institute*, 1947, **38**, A454.) C—**9.**

Protein Solutions: Ion Activity Determination. ("Determination of Sodium-Ion and Chloride-Ion Activities in Protein Solutions by Means of Permselective Membranes.") C. W. Carr and Leo Topol. *J. Phys. & Colloid Chem.*, 1950, **54**, 176-184. Specially prepared collodion membranes have been used as electrodes for the determination of sodium-ion activity in protein solutions. Similarly, protamine collodion membranes have been used for the determination of chloride-ion activity. Results are given for determinations of sodium-ion and chloride-ion activities in gelatin and in casein solutions. The method should be applicable to the determination of the activity of many small ions in the presence of water-soluble protein. C—**9.**

Membranes Containing Artificial Cation-exchange Materials: Development. M. R. J. Wyllie and H. W. Patnode. *J. Phys. & Colloid Chem.*, 1950, **54**, 204-227. Membranes have been prepared by bonding together intimately powdered mixtures of thermoplastic resins and artificial cation-exchange materials. When used to separate two sodium chloride solutions such membranes give rise to potentials which appear to follow those computed for the sodium electrode by the Nernst equation. Experimental results are given. It is suggested that the similar electrochemical properties of natural shales result from the similarity of their structure to that of the artificially prepared membranes, the cation-exchange material in the shale consisting primarily of clay minerals and the plastic bonding material being replaced by the electro-chemically inert constituents of the shale. C—**9.**

Mosaic Membranes: Electrolyte Permeability. Rex Nethoff and Karl Sollner. *J. Phys. & Colloid Chem.*, 1950, **54**, 157-176. The electrolyte permeability of mosaic membranes, which are composed of ideally anion-selective parts and ideally cation-selective parts in juxtaposition, is investigated theoretically by the consideration of model systems in which the parts are separated. General electrochemical considerations are presented which form the basis of the experimental test of the theory by means of model systems with auxiliary electrodes. The special geometrical arrangement is described of actual model systems. The calculation and evaluation of experimental data are discussed. The results support the theory quantitatively, for systems with auxiliary electrodes. C—**9.**

Phase Boundaries: Ion Diffusion Mechanism. ("The Mechanism of Diffusion of Ions Across a Phase Boundary and Through Cell Walls.") J. T. Davies. *J. Phys. & Colloid Chem.*, 1950, **54**, 185-204. The rates of diffusion of various salts through the water/nitrobenzene interface are inversely proportional to the water/oil partition coefficient, but the reverse rates are nearly constant, in agreement with a generalised theory of diffusion. In all cases the ionic mobility at the phase boundary is about one million times slower than in homogeneous systems, and this is explained, in conjunction with the highly negative entropy of diffusion, as a result of the process of diffusion across an interface involving a selective redistribution of many solvate molecules. Mono-layers of lipid and protein at the interface have no effect on the rate of diffusion. The rates of diffusion of salt at the water/nitrobenzene interface are compared with those in biological systems, and it appears that if interfacial diffusion is the rate-controlled factor in the passage of salts through the plasma membrane, the latter must be highly polar. There are 55 references to the literature. C—**9.**

Polystyrene: Diffusion of Chloroform; Dependence on Concentration. (1) R. F. Boyer; (2) J. Crank and G. S. Park. *J. Polymer Sci.*, 1950, **5**, 139-340; 140-141. (1) In connection with the diffusion of plasticizers in polyvinyl chloride the expression, $\log D = A - B(w_2)$ has been obtained, where D is the diffusion constant at a given concentration, w_2 is the weight fraction of the polymer, and A and B are constants. It has been applied to data on the diffusion of chloroform in polystyrene (obtained by Crank and Park) and a fair agreement is found. The equation emphasises how strongly the diffusion constant does increase with solvent concentration. (2) In reply to the first communication (1), it is reported that diffusion coefficient/concentration curves have been obtained for methylene chloride, chloroform, carbon tetrachloride, methylene bromide, bromoform, and methyl iodide in polystyrene. The results have all been shown to fit the expression $\log D = \alpha + \beta v$, where α and β are parameters and v is the volume fraction of the diffusing molecule. Over the range of concentrations considered, this expression and the one due to Boyes (above) are approximately mathematically equivalent. C—**9.**

Solids: Molecular-sieve Action. R. M. Barrer. *Quarterly Rev.* (*Chem. Soc.*), 1949, **3**, 293-320. A review is presented of the molecular-sieve action of solids, both porous sorbents and compact membranes. The flow of gases through a porous sorbent is considered in general terms and the effect of such factors as the size of the gas molecule, sorption potentials and the crystal structure of the sorbent is discussed. The classification of molecular sieves by reference to sorbate molecules of known dimensions is described. Separations by total and by partial molecular-sieve action are dealt with and the scope of the method is indicated. The molecular-sieve action of membranes of metals, silica and silicate glasses, and of organic membranes is dealt with. A final section discusses molecular-sieve processes in solution, such as ion exchange and chromatography. Throughout the review relevent data and graphs are given. C—**9.**

Polymer Networks: Statistical Mechanics of Swelling. P. J. Flory. *J. Chem. Phys.*, 1950, **18**, 108-111. Inaccuracies in published theories dealing with the swelling of network polymers in solvents are pointed out. The entropy of swelling a network of any degree of connectivity, or functionality f, is derived in a manner which avoids these inaccuracies. Corrected relationships are given for the partial molal-free energy of dilution, swelling equilibrium and the influence of deformation on swelling equilibrium. Previous expressions for elastic deformation at constant volume are unaffected. C—**9.**

Polymeric Systems: Influence of Structure on Internal Pressure. P. J. Flory. *J. Chem. Phys.*, 1950, **18**, 112-113. The development of the preceding paper is

applied to the calculation of the internal pressure contribution arising from the nature of the polymer structure. A general formula for the dependence of the internal pressure on polymer structure is given. Magnitudes of the calculated internal pressure contributions are sufficient to alter the specific volumes perceptibly. C—**9.**

Elastomers: Thermodynamics. ("Thermodynamics of One-Component and Two-Component Elastic Systems.") S. M. Katz. *Textile Research J.*, 1950, **20**, 16-21. A theoretical discussion. The thermodynamic analysis of stress in one-component, one-phase elastic systems is reviewed, and it is suggested that the stress might be evaluated in terms of entropy and enthalpy contributions. The analysis is then extended to two-component, two-phase systems, and the necessary equations are derived. Thus the temperature effect on swelling is taken into account. In addition, the basic hypotheses of the kinetic theory are shown to lead to thermodynamically impossible conclusions. C—**9.**

Branched-chain Compounds: Viscosity. ("Uber die Viskosität von verzweigten Verbindungen.") G. Bier. *Makromol. Chemie*, 1949, **4**, 124-133. The influence of branching on viscosity has been investigated by means of measurements on low-molecular substances of known constitution. Instead of using Staudinger's method of comparing solutions of equal weight concentration, the author here compares solutions of equal molecular concentration and determines the "molar viscosity number". By comparing the molar viscosity number of branched and unbranched chains of equal length, the influence of side-chains can be determined. Molar viscosity numbers and Staudinger viscosity numbers are tabulated for a number of unbranched and branched compounds with paraffin and ester side-chains. The data show that very short paraffinic side-chains have very little effect on molar viscosity, whereas ester side chains increase molar viscosity much more than paraffin side chains of equal size. Long paraffin and ester side chains increase the viscosity to about equal extents. The main conclusion of the work is the suggestion to characterise polymer-analogous and branched substances by their molar viscosity numbers. C—**9.**

Polymers: Viscosities of Very Dilute Solutions. S. Rothman, R. Simha and S. G. Weissberg. *J. Polymer Sci.*, 1950, **5**, 141-142. A few viscosity results are reported for toluene solutions of a polystyrene fraction (molecular weight = 500,000) in the concentration range from 0·017 g/dl. upward. The curve obtained by plotting reduced specific viscosity against concentration is shown. For concentrations up to 3 g/decilitre the curve can be adequately expressed by a Baker type of equation. C—**9.**

Light Sources: Maximum Luminous Efficiency of Various Chromaticities. D. L. MacAdam. *J. Optical Soc. America*, 1950, **40**, 120. A diagram is given showing the maximum possible luminous efficiency (lumens per watt) for all chromaticities, and an example of its use is discussed. The maximum possible luminous efficiencies indicate absolute limits against which efficiencies of practical sources can be compared, and possibilities for major improvements assessed. C—**9.**

Carbohydrates: Infra-red Spectra. L. P. Kuhn. *Anal. Chem.*, 1950, **22**, 276-283. Infra-red absorption curves are given for a number of sugars and their derivatives and for some cellulose derivatives. It is shown that infra-red spectroscopy can be used for the identification of sugars and of important functional groups in carbohydrate materials including cellulose. The possibility of using this method for the quantitative determination of nitrate groups in nitrocellulose is discussed. C—**9.**

Abridged Spectrophotometric Colorimetry with Photo-Cells. J. W. Perry. *J. Optical Soc. America*, 1950, **40**, 119. An outline is given of an abridged spectrophotometric colorimetry procedure that uses photo-electric differential colorimeters of the cell and filter type and is based on Hardy's selected ordinate method of colorimetric reduction. (See *J. Textile Institute*, 1949, **40**, A425.) C—**9.**

Colour Temperature Scale, 1949. D. B. Judd. *J. Res. Natl. Bureau Standards*, 1950, **44**, 1-8. The scale of colour temperature used by the American National Bureau of Standards since 1934 has been revised. The details of the revision are given, and the results are summarised in a table showing the conversion of colour temperature on the 1934 scale to that on the 1949 scale. The use of lamp standards of colour temperature to obtain known spectral distributions of

radiant flux between 380 and 770 millimicrons is discussed, and comparisons are made between the 1922 scale of colour temperature and the 1934 and 1949 scales for this purpose. C—9.

Optical Systems: Chromatic Variation of Spherical Aberration. W. Weinstein. *J. Applied Phys.*, 1950, **1**, 67-73. Formulæ are given for chromatic variation of spherical aberration in an optical system, (*a*) considered surface by surface, (*b*) considered as a collection of separated thin lenses. Three methods of treatment by other workers are discussed and criticized. C—9.

Hunter and Adams Colour Space: Expression on Munsell System. ("Munsell Renotations Used to Study Colour Space by Hunter and Adams.") Dorothy Nickerson. *J. Optical Soc. America*, 1950, **40**, 85-88. The colorimetric scales of recent Hunter and Adams proposals are studied in terms of the smoothed curves of the Munsell renotation space. Three conversion tables provide: I.C.I. (*X*, *Y*, *Z*) data; Adams' chromatic value data; and Hunter's *a* and *b*. Such use of Munsell renotation data makes it possible to visualise the colour spacing of the coordinates of any colour measuring instrument that is based upon or related to the I.C.I. system, and makes it possible to understand instrument results in terms of colour experience. C—9.

Multi-Component Systems: Light Scattering. ("Light Scattering Arising from Composition Fluctuations in Multi-Component Systems.") J. G. Kirkwood and R. J. Goldberg. *J. Chem. Phys.*, 1950, **18**, 54-57. A general theory of Rayleigh scattering due to fluctuations of composition in multi-component systems is developed with the aid of Gibbs's theory. It reduces to the usual expression for systems of two components, but contains previously neglected terms arising from thermodynamic interactions between solutes in systems of more than two components. The theory is used to interpret the turbidity measurements of polystyrene in mixtures of benzene and methanol. (Ewart, *et al.*, *J. Textile Institute*, 1947, **38**, A93.)

Multi-Component Systems: Light Scattering. W. H. Stockmayer. *J. Chem. Phys.*, 1950, **18**, 58-61. A general equation is developed for the fluctuation of refractive index in multi-component systems, thus permitting the interpretation of turbidities for such systems in the absence of angular dissymmetry. Applications to the systems (*a*) one polymer and two solvents, (*b*) two polymers and one solvent, and (*c*) heterogeneous polymer and one solvent, are presented. C—9.

Polymer-Polymer Interactions: Study by Light Scattering Measurements. ("Light Scattering Measurements of Interactions between Unlike Polymers.") W. H. Stockmayer and H. E. Stanley. *J. Chem. Phys.*, 1950, **18**, 153-154. A preliminary study is reported of light scattering due to polymethyl methacrylate-polystyrene interactions in butanone at 25° C. Turbidities have been measured for various constant-weight ratios of the two polymers. C—9.

Beta-ray Thickness Gauge. C. W. Clapp and Stanley Bernstein. *Gen. Electric Rev.*, 1950, **53**, No. 3, 31-34. The construction and operation of a typical β-ray thickness gauge are described. A source of β-rays is placed at a fixed position on one side of the sheet material and the number or energy of the rays that reach a fixed detector on the other side is measured. As physical contact with the sheet is not necessary the device can be applied to measuring the thickness of soft rubber or plastics, or of coated textiles and paper. C—9.

Static Coefficient of Friction and Area of Contact Measurement Apparatus. R. C. Parker and D. Hatch. *Proc. Phys. Soc.*, 1950, **63** B, 185-197. An apparatus for measuring the static coefficient of friction has been designed with which the forces tending to disturb the contact area are minimized and the contact area can be viewed throughout the experiment. Application of a tangential load, less than that required to give limiting friction, gives rise to a growth of both the real and apparent contact areas and produces a relative displacement of the surfaces to an extent governed by the tangential load. An examination of the surface topography, by means of an electron microscope, shows that the earlier type of slip ceases because surface scratches extend the boundaries of real contact. Both the force of adhesion and the tangential force vary linearly with the real and apparent areas of contact. These results are in accord with the cohesive theory of friction, and offer no support for the theory which attributes friction to the formation of welded junctions. Electron micrographs are presented. C—9.

Electron Microscope Externally Adjustable Objective Aperture. J. L. Farrant and A. J. Hodge. *J. Sci. Instruments*, 1950, **27**, 77-78. An illustrated description is given of the construction of an externally adjustable objective aperture for an electron microscope. The arrangement enables the diaphragm to be cleaned and centred again easily and quickly. C—**9**.

Latex Spheres as Size Standards in Electron Microscopy. C. H. Gerould. *J. Applied Phys.*, 1950, **21**, 183-184. Some comments are made on the use of latex spheres as size standards in electron microscopy. The results of the determinations of the particle size of latex by seventeen different laboratories and by various techniques are presented. The effect on particle size of diluting 40 per cent. latex with water has been investigated. Results indicate little or no effect. The prevention of agglomeration of the latex, bacterial contamination and overheating in the electron miscroscope are mentioned. C—**9**.

Three-stage Electron Microscope with Stereographic Dark Field. M. E. Haine, R. S. Page and R. G. Garfitt. *J. Applied Phys.*, 1950, **21**, 173-182. An electron microscope is described and illustrated in which a range of magnifications between 1,000 and 100,000 times can be covered continuously. This is achieved through the use of an intermediate projector lens. The principles of design are briefly discussed and the construction of the microscope and the high frequency-operated 100 kv. power unit is dealt with in some detail. The instrument is provided with objective apertures to enhance image contrast and to permit operation with dark field illumination. Data relating to the electron optical system are given and it is shown how the instrument can be used to obtain electron diffraction patterns characteristic of small areas of a specimen under microscopic observation. The alignment procedure is briefly described and some typical micrographs are shown. C—**9**.

High Polymers: Molecular Weight Investigations with the Electron Microscope. B. M. Siegel, D. H. Johnson and H. Mark. *J. Polymer Sci.*, 1950, **5**, 111-120. The electron microscope has been used to estimate the molecular weights of four polystyrene fractions which had molecular weights of $4{\cdot}8 \times 10^5$, $1{\cdot}1 \times 10^6$, $1{\cdot}8 \times 10^6$, and $2{\cdot}5 \times 10^6$ as determined by osmotic pressure and viscosity measurements. Dilute solutions (about 1 p.p.m.) of them in cyclohexane were deposited on collodion substrates in minute droplets. Shadow casting with uranium was employed. On assuming that the particles were single molecules and using the density of bulk polystyrene, the molecular weights obtained were 6×10^5, $9{\cdot}9 \times 10^5$, $1{\cdot}9 \times 10^6$, and $2{\cdot}5 \times 10^6$, which agree within the limits of experimental error with the osmotic pressure and viscosity values. The electron microscope should thus be useful for the determination of macromolecular weights above 10^6. C—**9**.

Polymer-Plasticizer Gels: Electron Microscopy. W. R. Richard and P. A. S. Smith. *J. Chem. Phys.*, 1950, **18**, 230. A short report is made of the use of high-density organo-mercury compounds as plasticizing agents for high polymers in the study of the structure of gel systems. The opacity to electrons imparted to the plasticizers by their high mercury content makes possible the use of the electron microscope to examine visually the scale of dispersion of the components of a polymer-plasticizer gel. Electron micrographs of polyvinyl butyral films plasticized with two such compounds are shown. C—**9**.

High Polymers: Depolymerization by Ultrasonic Irradiation; Role of Cavitation. Alfred Weissler. *J. Applied Phys.*, 1950, **21**, 171-173. Cavitation is responsible for the depolymerising effect of intense ultrasonic waves. This has been demonstrated by irradiating two portions of a 1 per cent. polystyrene solution in toluene. One portion, which was not given any special treatment, showed many cavitation bubbles during irradiation and decreased in molecular weight. The other portion, which was degassed before irradiation, showed no cavitation bubbles and suffered no change in molecular weight. Similar results were obtained with hydroxyethylcellulose in water. C—**9**.

Ultrasonic Vibration Pick-up. ("A Crystal Pick-Up for Measuring Ultrasonic Wave Velocity and Dispersion in Solid Rods.") A. E. Bakanowski and R. B. Lindsay. *J. Acoustical Soc. America*, 1950, **22**, 14-16. A piezo-electric crystal pick-up has been designed, constructed and successfully applied to the detection of internodal distances in a solid metal rod vibrating at resonance and thus

to the evaluation of configurational dispersion of ultrasonic compressional radiation in the rod. The use of the pick-up yields results as accurate as the powder method and can be applied in certain cases where the latter fails. C—**9.**

Ultrasonic Waves: Velocity of Propagation in Low and High Molecular Substances. ("Die Fortpflanzungsgeschwindigkeit der Ultraschallwellen in Stoffen mit niedrigem und hohem Molekulargewicht.") G. Natta and M. Baccaredda. *Makromol. Chemie.*, 1949, **4**, 134-155. The ratio between experimental and calculated ultrasonic velocity (considering radical velocities rather than bond velocities[1]) may represent a means of determining the number and size of branchings. This ratio is termed the "shape factor". It is unity or slightly higher for unbranched or slightly branched compounds with high molecular weight (paraffins, polyethylenes, polyethylene oxide, nylon), but lower for branched compounds (0·90 for natural rubber, 0·79-0·80 for polyisobutylenes). It is also shown that the shape factor is affected (lowered) by both the frequency and the length of the branchings. The data also support the view that for high-molecular compounds the shape factor is independent of molecular weight. ([1]*J. Textile Institute*, 1950, **41**, A93.) C—**9.**

Fatigued Rubber: Stress/Strain Curves. D. F. Stedman. *Canadian J. Res.*, 1950, **28**, F, 31-49. Stress/strain curves have been obtained for moulded rings of natural rubber. Extension curves (except the ones obtained when the rings were stretched for the first time) are in two parts, and the second part does not develop except after severe previous extensions. The fifth extension curve, which is in two clearly separate parts, with a sharp inflection at 380 per cent. elongation, has been investigated. Equations which fit the two parts of the curve are developed. Hysteresis occurs only in certain ranges of extension and this effect is discussed. In a general discussion the kinetic elasticity of rubber is dealt with. C—**9.**

Rubbery Materials: Dynamic Mechanical Properties. A. W. Nolle. *J. Polymer Sci.*, 1950, **5**, 1-54. Data concerning the dynamic mechanical behaviour of rubbery materials over a range of frequency and temperature (−60° to +100° C.) have been obtained by five techniques described previously.[1] The quantities which are found from the experimental methods are the real and imaginary parts E_1 and E_2 of the complex dynamic Young's modulus E^*, where $E^* = E_1 = iE_2$. Experimental results are mostly given in terms of the real part of the modulus, E_1, and the dimensionless "loss factor", E_2/E_1. A fairly extensive theoretical discussion of the results is presented. ([1]*J. Textile Institute*, 1949, **40**, A28.) C—**9.**

Visco-elastic Substances: Frictional Loss. B. Gross. *J. Applied Phys.*, 1950, **21**, 185. A previous theory[1] of linear visco-elastic behaviour is given further consideration. In addition to the relaxation mechanism it seems likely that another cause for elastic loss lies in a "true" frictional mechanism. This leads to loss varying independently of the visco-elastic loss and the corresponding frictional force is assumed to be proportional to the rate of change of deformation. The new loss component will be of importance at very high rates of deformation (or high frequencies). A mathematical treatment is developed for a linear strip of material for which the unidimensional wave equation is used. ([1]*J. Textile Institute*, 1947, **38**, A281; 1948, **39**, A352.) C—**9.**

Visco-elastic Substances: Mechanical Behaviour. Robert Sips. *J. Polymer Sci.*, 1950, **5**, 69-89. By means of a generalised Maxwell model, or otherwise the Boltzmann principle of linear superposition, a general relation is obtained between force and deformation for a linear sample of a visco-elastic substance. The only experimentally determined datum that the relation contains is the relaxation function. By using this function it is possible to predict all the usual properties, and in particular extension and recovery. The relationship between extension and relaxation can be expressed by a linear integral equation of the Volterra type. Several methods of solving this equation are indicated and one of them has been applied to an actual experimental case, namely polyisobutylene. The observed and calculated values of the creep function are in very good agreement. C—**9.**

X-Ray Scanning Camera. J. Thewlis and A. R. Pollock. *J. Sci. Instruments*, 1950, **27**, 72-73. An X-ray scanning camera is described and illustrated, which has been designed to eliminate spottiness from X-ray photographs of coarse-grained material, for work on crystalline orientation. C—**9.**

Polyvinyl Chloride Plasticized with Diphosphate Esters: Creep Behaviour. R. H. Oliver, N. M. Wiederhorn and R. B. Mesrobian. *Ind. Eng. Chem.*, 1950, **42**, 488-491. The creep of vinyl chloride resin plasticized with new derivatives of phosphate esters has been studied. The most satisfactory method of preparation of a series of phosphate esters of the type $(RO)_2 \cdot PO \cdot O \cdot (CH_2)_n \cdot O \cdot PO(OR)_2$ is the reaction of stoichiometric quantities of mono- and dihydric alcohols with phosphorus oxychloride. The plasticizing efficiency of the diphosphate esters, compared by tensile creep with commercially used plasticizers, is quite satisfactory over a wide range of temperature. C—**9.**

Ionic Liquids: Sedimentation Phenomena. ("Electroviscosity" III.) G. A. H. Elton. *Proc. Royal Soc.*, 1949, **197A**, 568-572. It is shown that the rate of sedimentation of a system of particles in an ionic liquid may vary markedly with the ionic concentration, because of variation in the electroviscous forces that resist shear in the double layer of ions associated with each particle. Equations governing the rate of sedimentation are derived, and used to calculate values for the electro-kinetic potentials of carborundum in potassium chloride solutions, from data on sedimentation velocity. These values are compared with those previously obtained from data on electroendosmosis. C—**9.**

Long-chain Polymers: Structural Analysis by Polarised Infra-red Radiation. E. J. Ambrose, A. Elliott and R. B. Temple. *Proc. Royal Soc.*, 1949, **199A**, 183-198. In continuation of a previous study[1] the use of polarised infra-red radiation (spectral region 2500-4000 cm.) in examining the structure and orientation of high polymers has been investigated quantitatively. Infra-red spectroscopy gives evidence of double orientation in rolled sheets of nylon 66, polyvinyl alcohol, and (with less certainty) polythene but not in polyvinyl formate, acetate or chloride or in polyvinylidene chloride. There is evidence that in nylon the N-H bond is bent by hydrogen bonding forces. The structure of polyvinyl alcohol recently proposed by Bunn (1948) receives strong support from the absence of dichroism in the O-H frequency in the spectrum of that material, when a doubly orientated specimen is examined. ([1] *J. Textile Instatute*, 1948, **39**, A622.) C—**9.**

Styrene: Rate Coefficients of Polymerisation. H. W. Melville and L. Valentine. *Trans. Faraday Soc.*, 1950, **46**, 210-227. Rate coefficients have been determined for the benzoyl peroxide photo-sensitized polymerisation of styrene. The rate of polymerisation is proportional to the square root of both the light intensity and the concentration of catalyst. The rate coefficients were determined from a combination of life-time studies by using a modified sector technique and measurements of the degree of polymerisation. Results are analysed. The question whether polymer radicals disproportionate or combine is discussed and some observations are made on radical reactivity as adduced from the absolute values of the various velocity constants. C—**9.**

Vinyl Acetate: Polymerisation; Velocity Constants. ("Studies in Polymerization." V.) G. Dixon-Lewis. *Proc. Royal Soc.*, 1949, **198A**, 510-522. The velocity constants of propagation, transfer and termination in the photo-polymerisation of vinyl acetate at $-15°$ and $0°$ C. have been determined by the viscosity method. Results are compared with those of other authors. The quantum yield of the initiating reaction is only about 0·04. C—**9.**

Colour: Specification; Use of Objective Measurements. H. R. Davidson. *Functional Photography*, 1950, **1**, No. 6, 16-18. An elementary account is given of the fundamentals of colorimetry and the International Illumination Commission (I.C.I.) system of colour specification and the use of chromaticity diagrams are explained. C—**9.**

Printing Papers: Measurement of Opacity and Reflectivity. V. G. W. Harrison and S. R. C. Poulter. *Brit. J. Applied Phys.*, 1950, **1**, 13-17. A form of reflectometer for measuring the "show through" tendencies of printing papers is described and illustrated. The instrument can also be used for measuring reflexion factors. "Diffuse illumination, normal viewing" and "normal illumination, diffuse viewing" can both be used and are shown experimentally to be practically equivalent, but the latter is more convenient. The instrument gives results in good agreement with other standard opacimeters. C—**9.**

Compressible Fluids: Flow through Divergent Nozzles. ("The Estimation of Velocities and Local Mach Numbers in the Flow of a Compressible Fluid through Divergent Nozzles under Adiabatic and Isothermal Conditions.") R. K. Tempest. *Phil. Mag.*, 1950, [vii] **41**, 382-392. A theory is developed that gives the approximate velocity at any point in an inviscid compressible fluid flowing through a divergent nozzle. The formulæ are applicable to either subsonic or supersonic flows; they may be applied over any length of tube and from them the variation of the local speed of sound and Mach number may be estimated. Numerical examples are given to demonstrate the very large increases in local velocity and Mach number in supersonic flows associated with comparatively small variation of the expansion ratio of the nozzles. A comparison with results of one-dimensional theory is made in the case where the velocity is approximately uniform across sections perpendicular to the axis of the nozzle. C—**9.**

Elasticity: Theory in General Coordinates. A. E. Green and W. Zerna. *Phil. Mag.*, 1950, [vii] **41**, 313-336. A fairly extensive treatment of elastic theory in tensor notation, for finite displacements, is presented under the headings: (i) Introduction; (ii) Displacement vector. Deformation; (iii) Strain tensor; (iv) Equations of compatibility; (v) External force. Stress tensor; (vi) Equations of motion and equilibrium; (vii) Virtual work; (viii) Strain-energy function; (ix) Variational, work and energy principles; (x) Stress-strain relations; and (xi) Elastic coefficients. C—**9.**

PATENTS

Continuous Centrifugal Separator for Starch and Gluten. De Laval Separator Co. (assignees of G. J. Strezynski). B.P.627,676 of 8/8/1947: 12/8/1949 (Conv. 10/8/1946). In a continuous process for recovering starch from a mixture of starch, gluten and water (*e.g.* corn starch tailings) the mixture is fed to a centrifugal separator and discharged in three separate streams, one rich in starch, one in gluten and the third mainly water. C.

Tetrahydrofuran: Stabilising against Peroxide Formation. E. I. du Pont de Nemours and Co. B.P.627,897 of 21/4/1947: 18/8/1949 (Conv. 20/4/1946). Tetrahydrofuran tends to form explosive peroxides on storage. This is inhibited by the addition of 0·05 to 1 per cent. of *p*-cresol. C.

10—ECONOMICS

American Textile Mills: Annual Review and Forecast. (1) R. C. Scott; (2) R. U. Ulin; (3) C. W. Bendigo; (4) W. A. Newell; (5) P. M. Thomas; (6) C. N. Rabold and N. D. Marius; (7) C. P. Wood; (8) M. P. Miller; (9) Don Loomis; (10) Several contributors; (11) E. D. Fowle. *Textile World*, 1950, **100**, No. 2, (1) 107-108; (2) 108-110; (3) 111; (4) 112-113; (5) 113-114; (6) 114-115; (7) 115-116; (8) 116; (9) 117; (10) 117-119, 212, 215, 216, 218, 220, 222, 224, 226; (11) 120-121, 208, 210, 212. (1) *Activity*. The trend of general textile activity is traced from 1929 to 1949. (2) *Production*. Charts show U.S. fibre consumption and production of cotton, woollen, and rayon woven goods over a number of years up to 1949. Production during 1949 is briefly reviewed. (3) *Purchases*. Purchases of equipment and supplies by U.S. textile mills during 1949 are briefly discussed. (4) *Machinery Developments*. Textile machinery and laboratory equipment introduced during 1949 and described in "*Textile World*" is listed. References are given. (5) *Research*. Mention is made of research on new fibres, nylon, cotton and wool. (6) *Finishing Developments*. Development has been towards continuous processing. High temperatures, alkaline curing resins, radio-active substances and synthetic detergents are becoming important. Wool finishing developments are briefly discussed. (7) *Engineering*. Plant layout, materials-handling equipment, and construction materials and techniques are mentioned. (8) *Personnel*. Attention is focussed on the individual employee. (9) *Washington Developments*. The U.S. government forecast for the textile trade during 1950 is presented. (10) *Foreign Picture*. Brief reports are presented from the various textile producing countries of the world. A table is given to show the world position of textiles in 1949. (11) *European Machinery Developments*. Developments mentioned include the Shirley Auto-Doffer, the Nastrofil cotton spinning frame, the Hegemax preliminary twisting device, and the Fayolle-Ancet circular loom. C—**10.**

Italian Rayon Export Trade. *Brit. Rayon & Silk J.*, 1950, **26**, February, 72-73, 78. A survey is made of the Italian rayon export trade over the period from 1935 to 1949. Trends and fluctuations in the market are accounted for. Tables show figures for exports of (1) filament singles rayon yarn, and (2) all-rayon fabrics broken down by countries of destination. British and Italian exports of all-rayon fabrics are compared for 1937 (full year) and 1949 (first 9 months). **C—10.**

United States Rayon Trade, 1949. *Rayon Organon*, 1950, **21**, 17-32. Basic statistical data (production, distribution and consumption) are presented for the U.S. rayon industry in detail and for the textile industry in general, for 1949 and selected earlier years. Rayon production in 1949 was 12 per cent. below 1948, but 2 per cent. above 1947. **C—10.**

German Rayon Export Trade. *Brit. Silk and Rayon J.*, 1950, **26**, March, 82-83. The German rayon export trade (pre- and post-war) is briefly surveyed. Tables show the 1948 production of rayon and the 1949 (March) capacity for each of the four zones of Germany, and 1949 exports of filament and staple rayon yarn and rayon fabrics to various countries. **C—10.**

Indian Raw Cotton and Cotton Mill Industries in 1949. *Indian Textile J.*, 1950, **60**, 314 315, 318. An official review is presented of the state of the Indian raw cotton and cotton mill industries in 1949. Raw cotton and cloth production, imports and exports are discussed. **C—10.**

International Cotton Trade: Statistics. *Textile Weekly*, 1950, **45**, 900-906. The following tables are culled from a report issued by the United Nations Organisation. (1) Values in dollars of World exports of all goods and of cotton, 1937-38 and 1946-48; cotton goods make up about 2·3 per cent. of the total. (2) Trends in quantity and unit value of exports, expressed as units. In 1948 the quantity of total exports was 94 per cent. but the share of cotton goods was only 57 per cent. of the figures for 1937. The price indexes for 1948 were 224 for "all goods" and 318 for cotton goods, compared with 100 for 1937. (3) International trade in raw cotton; values and weights of cotton exported by the United States, Brazil, Egypt, and India + Pakistan, and also of imports by the United Kingdom. (4) Quantity and price indexes of U.S. total trade and exports of cotton. (5) Quantity and price indexes of U.K. total exports, total imports and cotton imports. A world map indicates the "flow" of raw cotton from the fields to Western Europe, China and Japan. **C—10.**

Swedish Textile Industry. Economics. ("La position textile de la Suède.") Pierre de Laveleye. *Rayonne*, 1950, **6**, No. 1, 125-130. A survey is presented of the actual economic position of the textile industry in Sweden, in particular the cotton, wool, flax and hemp, jute, and rayon sections. Import and production figures for spun and woven products for the years 1936 through 1948 are tabulated and data on Belgian textile exports to Sweden are also given. **C—10.**

Textile Machinery: Production in Czechoslovakia. *Textile Manufacturer*, 1950, **76**, 122-124. A well illustrated description is given of some aspects of textile machinery production in Czechoslovakia. The survey deals briefly with winding machinery, warp preparation equipment, looms, dobbies, Jacquards and printing and finishing equipment. **C—10.**

United States Textile Fibre Consumption. *Rayon Organon*, 1950, **21**, 38-47. A comprehensive statistical survey is presented of the consumption of textile fibres (cotton, wool, silk, and artificial fibres) in the U.S.A. during 1949. Figures are compared with those of previous years back to 1920. Several tables of data are given showing consumption, stocks, price trends, industrial and consumer market indicators, and wage earnings, for both yearly and monthly periods. **C—10.**

Warner and Sons Ltd: History. A. B. Hunter. *J. Textile Institute*, 1950, **41**, P41-P51. A lecture in which a fairly extensive account is given of the history and development of the silk weaving firm of Warner and Sons Ltd., London and Braintree. **C—10.**

Eire Flax Growers' Profit. *Linen Trade Circular*, 1950, **36**, April 1, 13. Reference is made to a letter in the *Irish Times* which states that the average net profit for flax growers in Co. Cork last year was £37 10s. 0d. per acre. This was at the average price of 29/6d. per stone. This year the Flax Spinners' Asso-

ciation of Northern Ireland has guaranteed to pay world prices plus 5 per cent. in the market for flax grown in Southern Ireland within a minimum of 25/- for Grade 5, dam-retted and hand-scutched. L—**10.**

Ulster Flax Prices. *Linen Trade Circular*, 1950, **36**, No. 5, Feb. 5, 1. Flax prices for growers in Northern Ireland were fixed in January. Dam-retted flax ranges from 41/- per stone, hand-scutched, for Grade I to 33/6 per stone, hand-scutched for Grade 6, and 42/6 per stone, turbine-scutched, Grade I to 35/- turbine scutched, Grade 6. Prices to be paid by spinners have not been announced yet. This will determine the subsidy. These growers' prices are 5/- a stone less than last year. The farmers representatives are not satisfied, as production costs have not come down since the 1949 season. L—**10.**

Northern Ireland Flax Subsidy. *Linen Trade Circular*, 1950, **36**, April 22, 2. Growers who wish to qualify for any subsidy which may be payable in 1950, must apply to the Ministry of Agriculture not later than June 5. A subsidy is payable only if spinners' prices in the markets are less than the standard growers' prices fixed by the Ministry. These range this year from 33/6 a stone for Grade 6, hand-scutched and dam-retted, to 41/- a stone for Grade 1. An extra 1/6 is paid for turbine-scutched flax. More may be paid if world prices rise. Prices to be paid by spinners have not yet been announced. L—**10.**

Italian Flax Yield. *Linen Trade Circular*, 1950, **36**, April 8, 1. Figures given are:—

Area	1947/48	19,536 hect.	
	1948/49	20,821 ,,	
Production	1947/48	5,701 metric tons	
	1948/49	5,620 ,, ,,	
Yield	1947/48	292 kilos/hect.	
	1948/49	270 ,, ,,	

L—**10.**

Jute in U.S.A.: Indian Jute Mills Association Report. *Linen Trade Circular*, 1950, **36**, April 8, 14. The Indian Jute Mills Association delegation to the U.S.A. has submitted a report. It was found that the use of jute has decreased, partly owing to bulk handling of grain, and other industrial techniques, but principally owing to price and availability. Many American users have turned to cotton, paper and other substitutes. American bag manufacturers still look favourably on jute, realising its many merits. The establishment of a reasonable price level and the assurance of regular supplies are needed to get back into a competitive position. L—**10.**

11—INDUSTRIAL WELFARE, INDUSTRIAL PSYCHOLOGY AND EDUCATION

Pre-determined Motion Time Standards. Winston Rodgers. *J. Inst. Works Managers*, 1950, **2**, 37-41, 46. The "Methods' Time Measurement" (M.T.M.) system of motion study is described, and its application, advantages and limitations are discussed. On this system the elements of an operation are split up into basic motions and classified. To each motion a Time Measurement Unit (one T.M.U. = 0·036 second) is assessed. C—**11.**

Georgia Institute of Technology Textile Department. ("Latest in Textile Education.") *Textile World*, 1950, **100**, No. 2, 130-131. A brief illustrated description is given of the new textile department of the Georgia Institute of Technology. C—**11.**

Dyeing and Finishing Plants Workers: Injuries and Accident Causes. Marion Hammett. *Textile Industries*, 1950, **114**, No. 2, 95-97. Causes of accidents in dyeing and finishing plants are analysed. Diagrams are used to show how the number of accidents is distributed between the various causes. C—**11.**

American Knitting Mills: Modern Production Methods. *Textile Industries*, 1950, **114**, No. 2, 141-155. Twelve case histories describe the use and performance of new knitting equipment and accessories in American mills. C—**11.**

American Textile Mills: Modern Production Methods. *Textile Industries*, 1950, **114**, No. 2, 98-138. A series of 49 short articles is presented, giving actual case histories of what American textile mills are doing to increase production, lower operating costs, improve quality, utilise man-power more efficiently, reduce and control waste, and secure improved operating conditions by the proper use of equipment accessories, and services made available to the industry. C—**11.**

Swedish Textile Mills, Organisation. Tore Ericsson. *Textile Recorder*, 1950, **67**, March, 72-75; April, 69-71. The organisation of a textile company in Sweden and systems of management are discussed and the question of the centralisation or decentralisation of control is considered. The argument is illustrated by charts showing the organisation of "centralised" and "decentralised" companies. The importance of policy is emphasised and typical distributions of activities in a Swedish mill of average size and in a large textile company are described and illustrated. **C—11.**

Cloth Burling and Mending. T. G. McLaren. *Fibres*, 1950, **11**, No. 3, 75-78. It has been proved that by properly directed training a competent mender may be trained in six months. While some employers claim that it is waste of labour to put highly skilled menders on the simpler process of burling, others contend that a burler/mender will take greater care since she will be held responsible for the whole operation. The author describes the two general methods of burling, *viz.* burling over the perch or pole, and burling on the table, and discusses the importance of piece marking (by means of both chalk and thread), different methods of mending, *etc.* A description of the method of training used at the Production Unit of the Scottish Woollen Technical College, Galashiels, is included. **W—11.**

Textile Organisation and Production: Chap. II. A. E. Clifford. *Fibres, Fabrics & Cordage*, 1950, **17**, No. 2, 51-54. The evolution of textile organisation from the days of small firms gradually developing out of the businesses of individual craftsmen, is traced. Reference is made to Taylor's work in the U.S.A., possibly the earliest scientific study of industrial changes. His analysis of the duty of foremen is quoted. The merits and demerits of "line organisation" and "functional organisation" are summed up. Present day types of organisation tend to be a compromise between these two systems. Whilst production departments have a direct line control, there is an additional staff of specialists (engineers, chemists, accountants, buyers, salesmen, *etc.*) without executive authority. It is important that the authority and function of each individual is clearly defined. Success of an organisation depends largely on the degree of co-operation throughout the factory and offices. The committee type of organisation, confined to very large concerns, is discussed. The two main kinds used in industry are the advisory, consisting of officials expressing different functions, but having the same standing, and the executive, which discusses problems of everyday business and can enforce immediate action. There is a tendency in large firms to split up into small specialist groups, working to a main production policy, with good co-ordination between the individual factories. Experiments have taken place in some firms in the four-board system—senior, junior, production, and labour. The organisation of this system is discussed briefly. **L—11.**

12—CONFERENCES AND EXHIBITIONS

Rayon and Silk Yarn: Preparation for Weaving and Knitting. Textile Institute. Reports of the Textile Institute Conference at Macclesfield, 4th February, 1950, are given in *Textile Mercury & Argus*, 1950, **122**, 213-215, 281-284, 315-318; *Textile Weekly*, 1950, **45**, 340-344, 492-494; and *Textile Manufacturer*, 1950, **76**, 105-108. **C—12.**

American Mechanical Engineers: Textile Technology Conference. American Society of Mechanical Engineers. *Brit. Rayon & Silk J.*, 1950, **26**, February, 57, 59. A brief report is presented of papers read at the 70th annual meeting of the American Society of Mechanical Engineers. The subjects discussed include air conditioning, the increasing use of glass fibres in textiles, instrumentation trends, and the need for more engineers in the textile industry. **C—12.**

Textile Machinery at the Milan Fair. ("Il macchinario tessile esposto alla Fiera di Milano.") *Rivista Tessile*, 1949, **4**, 345-353, 457-465. Illustrated descriptions are given of spinning, winding, weaving, and finishing machinery exhibited at the Milan Fair, 1949, with special reference to machines exhibited by Italian firms. **C—12.**

Viruses and Proteins: Electron Microscopy and X-Ray Analysis. Institute of Physics. *Brit. J. Appl. Phys.*, 1950, **1**, 57-59. A summary is presented of papers on "The Investigation of Biological Systems by the Electron Microscope and by X-Ray Analysis" given during the Institute of Physics' convention held in Buxton in May, 1949. The papers deal with virus and protein studies. **C—12.**